PART I: GENERAL – ELECTRICAL

1–1 DESCRIPTION:

All work on these drawings shall be done in strict accordance with these specifications. All work fairly implied as essential to the complete functioning of the electrical systems shown on the Drawings and Specifications shall be completed as part of the work of this Division unless specifically stated otherwise. It is the intention of the Drawings and Specifications to establish the types of the systems, but not set forth each item essential to the functioning of the system. In case of doubt as to the work intended, or in the event of amplification of clarification thereof, the Contractor shall call upon the Architect for supplementary instructions, Drawings, etc. [Refer to landlord's criteria for additional requirements and include in bid.]

1–2 WARRANTY:

The undertaking of the work described in this Division shall be considered equivalent to the issuance, as part of this work, of a specific guarantee extending one year beyond the date of completion of work and acceptance by Owner, against defects in materials and workmanship. Materials, appliances and labor necessary to effect repairs and replacement so as to maintain said work in good functioning order shall be provided as required. Replacements necessitated by normal wear in use or by Owner's abuse are not included under this guarantee.

1–3 PROJECT CONDITIONS:

Visit the site of the proposed construction in order to fully understand the facilities, difficulties and restriction attending the execution of the work. No additional compensation will be allowed this Contractor for work or items omitted from his original Proposal due to his failure to inform himself regarding such matters affecting the performance of the work in this Contract or necessary for the installation and completion of the work included herein.

1–4 PERMITS AND FEES:

The contractor shall arrange and pay for all permits, fees, tests, and all inspections as required by governmental authorities.

1–5 COORDINATION WITH FIELD CONDITIONS:

Contractor shall review all pertinent Drawings and adjust his work to all conditions shown there on.

Discrepancies between Plans, Specifications, and actual field conditions shall be brought to the prompt attention of the Architect.

Approximate location of transformers, feeders, branch circuits, lighting and power outlets panels, outlets for special systems, etc., are indicated on the Drawings. However, the Drawings, do not give complete and accurate detailed locations of such outlets, conduit runs, etc., and exact locations must be determined by actual field measurement. Such locations will, at all times, be subject to the approval of the Architect.

Communicate with the Architect and secure his approval of any outlet (light fixture, receptacle, switch, etc.) location about which there may be the least question. Outlets obviously placed in a location not suitable to the finished room or without specific approval, shall be removed and relocated when so directed by the Architect. Location of light fixtures shall be coordinated with reflected ceiling plans.

1–6 SUBMITTALS:

Contractor shall provide six sets of submittals, shop drawings, descriptive literature, physical data and a specification critique for the following items:

Heavy Duty Disconnect Switches
Wiring Devices and Plates
Conduit and Fittings
Wire

Any deviations from the specified items shall be listed on the cover sheet and clearly itemized for all deviations. The contractor shall provide two copies of owner's manuals to the architect upon completion of the work.

1–7 SUBSTITUTIONS

A. The names, manufacturers, and model numbers have been used in the Contract documents to establish types of equipment and standards of quality. Where more than one manufacturer is named for a specific item of equipment, only one of the specified manufacturers will be considered for approval. Where only one manufacturer is mentioned with the phrase "or approved equal", Contractor may submit an alternate manufacturer for consideration, provided the following conditions are met:
   1. Submit alternate equipment with complete descriptive data in shop drawing form. Provide sample of equipment upon request for review by Architect. Samples will be returned if requested in writing.
   2. Alternate equipment must be equal from the standpoint of materials, construction and performance.
   3. Alternate submittal must be presented to the Engineer/Architect ten (10) days prior to bid date for approval.

B. The Architect and Engineer shall be the sole judge of quality and equivalence of equipment, materials and methods.

1–8 QUALITY ASSURANCE:

All work shall be performed in accordance with all state, local & federal codes and all authorities having jurisdiction, including but not limited to:

National Electrical Code (NEC)
American Society for Testing and Materials (ASTM)
Underwriter's Laboratories, Inc. (UL)
Insulated Power Cable Engineer's Association (IPCEA).
National Electrical Manufacturer's Association (NEMA).
Institute of Electrical and Electronics' Association (IEEE).
American National Standards Institute (ANSI).
National Fire Protection Association (NFPA).

1–9 SLEEVES, CUTTING AND PATCHING:

This Section shall be responsible for the placing of sleeves for all conduit passing through walls, partitions, beams, floors, roof, etc. Sleeves through below–grade walls shall be as specified and detailed on the plans.

All cutting and patching will be done under another Division, but this Section will be responsible for timely performance of this work and layout of holes and setting sleeves.

1–10 EXCAVATION AND BACKFILL:

Trenching and backfilling and other earthwork operations required to install the facilities specified herein shall conform to the applicable requirements of Division 2 (95% of maximum standard density). Where trenching or excavation is required in improved areas, the backfill shall be compacted to a condition equal to that of adjacent undisturbed earth and the surface of the area restored to the condition existing prior to trenching or excavating operations. The plans indicate information pertaining to surface and subsurface obstructions; however, this information is not guaranteed. Should obstructions be encountered whether or not shown, the Contractor shall alter routing of new work, reroute existing lines, remove obstructions where permitted, or otherwise perform whatever work is necessary to satisfy the purpose of new work and leave existing surfaces and structures in a satisfactory and serviceable condition.

1–11 CLEANING:

Clean lighting fixtures and equipment.

Touchup and refinish scratches and marred surfaces on panels, switches, starters, and transformers.

1–12 TESTS AND INSPECTIONS

Tests and inspection requirements shall be coordinated Architect.

Date for final acceptance test shall be sufficiently in advance of completion date of contract to permit alterations or adjustments necessary to achieve proper functioning of equipment prior to contract completion date.

Conduct re–tests as directed by Architect on portions of work or equipment altered or adjusted as determined to be necessary by final acceptance test. No resultant delay or consumption of time as a result of such necessary re–test beyond contract completion date shall relieve Contractor of his responsibility under contract.

Put circuits and equipment into service under normal conditions, collectively and separately, as may be required to determine satisfactory operation. Demonstrate equipment to operate in accordance with requirements of these specifications. Perform tests in the presence of Architect. Furnish instruments and personnel required for tests.

At the time designated by the Architect, the entire system shall be inspected by the Architect and Engineer. The contractor or his representative shall be present at this inspection.

Panelboards, switches, fixtures, etc., shall be cleaned and in operating condition. Certificates and documents required herein before shall be in order and presented to the Architect prior to inspection.

Panel covers, junction box covers, etc., shall be removed for visual inspection of the wire, bus bars, etc.

After the inspection, any items which are noted as needing to be changed or corrected in order to comply with these specifications and the drawings shall be accomplished without delay.

PART 2: PRODUCTS – ELECTRICAL

2–1 ALL PRODUCTS:

All products shall be listed by Underwriter's Laboratories and have the U.L. label affixed.

2–2 RACEWAYS AND FITTINGS:

Except as noted or otherwise specified, all wiring shall be installed in galvanized rigid steel conduit or electrical steel tube (EMT) of the proper size to contain the number of conductors required in accordance with the latest edition of the N.E.C. Where conduit sizes are shown on the drawings, those shall take preference.

Provide EMT in sizes up to 4 inches when concealed or not exposed to damage; Rigid steel, galvanized for underground use, where exposed to damage, or in exterior applications; Rigid galvanized steel where embedded in concrete or masonry construction.

Minimum size shall be 3/4 inch except for fixture whips not exceeding 6'–0" long. Branch circuits run underground shall be run in Carlon Schedule 40 PVC conduit. Install ground wire in accordance with NEC table 250–95. Electrical metallic tubing systems shall utilize watertight compression type fittings where exposed to moisture and set screw type fittings elsewhere.

Conduit shall be run concealed in finished areas. Conduit may be exposed in mechanical rooms and where otherwise indicated.

Concealed conduit shall run in as direct manner with as long bends as possible. Exposed conduit shall be run parallel with, or at right angles to the lines of the building; and all bends shall be made with standard conduit ells or conduit bent to not less than same radius. Not more than equivalent of four quarter bends shall be used in any run between terminals and cabinet, of between outlet or junction boxes. Approved conduits shall be used in lieu of conduit ells where ease of installation and appearance warrants their use. Conduit joints shall be made with approved couplings and unions.

Provide #30 nylon pulling line in all conduits in which permanent wiring is not installed.

Branch circuit conduits installed in concrete slabs on fill or grade shall be positioned in a manner to ensure complete concrete cover. In no case shall such conduits be exposed below or above the slab surfaces, or penetrate the waterproof membrane.

At locations where feeder, or other large conduits, must pass through slabs on fill or grade, the conduit shall be PVC coated rigid galvanized steel, extended 6 inches into the earth, and 2 inches above exposed surface of slab.

All conduit shall be securely fastened and supported using hot galvanized malleable iron one–hole pipe straps, clamps, hangers or other means proved by the engineer. Supports shall be as required by NEC Table 346–12. Tie wire shall not be used as support or securing means. Support conduit independently of ceiling hanger wire.

2–3 OUTLET AND JUNCTION BOXES:

Provide an approved galvanized outlet box with adequate volume for number of conductors concerned.

Provide standard galvanized switch boxes of the required number of gangs. Switch boxes for exposed wiring shall be handy boxes or approved equal.

Outlet boxes for receptacles shall be similar to Universal 52151 with suitable raised cover. Receptacle boxes on exposed wiring shall be handy boxes or approved equal.

Weatherproof boxes where necessary shall be FS or FD.

Outdoor boxes shall be NEMA 3R, with conduit connections made by Myers Hubs.

See notes and details on Drawings for special box requirements.

Provide junction boxes required to facilitate installation of the various conduit systems. Provide support boxes required for risers, each complete with approved cable supports as described elsewhere in this Division.

Outlet boxes for drywall shall be standard galvanized switch boxes.

Provide coverplates for all outlet boxes.
Provide junction boxes and conduit system for all electrical systems: (i.e. electrical, sound, security, fire alarm, CCTV, cameras, CATV, intercom).

2–4 PULL BOXES:

Pull boxes shall be provided for conduit systems as required and shall be constructed of galvanized steel of not less than gauge and size specified by National Electrical Code.

Where two or more feeders pass through a common pull box, they shall be tagged to indicate clearly their electrical characteristics, circuit number, and panel designation.

2–5 WIRE AND CABLE:

All wire shall be new and continuous without weld, splice, or joints throughout its length. It must be uniform in cross–section, free from flaws, scales and other imperfections.

Wire shall be soft drawn, annealed, 98% pure copper, with tin coating. Aluminum wiring is not acceptable.

Acceptable manufacturers for 600 volt wire and cable shall be Southwire, Triangle PWC, Carol, and Rome Cable Company.

Acceptable manufacturers for 300 volt wire and cable shall be Westpenn, Beldon, and Alpha.

Acceptable manufacturers for connectors shall be AMP, Burndy, Ideal, 3M, O.Z. Gedney, and Thomas & Betts.

A. TYPES:

1. Provide code gauge type "THHN" or "THWN" insulation.

2. All wire No. 8 and larger shall be stranded. All wire No. 10 and smaller shall be solid. Minimum wire shall be No. 12, unless otherwise shown on Drawings.

3. Provide type "RHH" or other 90 degrees C insulation wiring for branch circuit wiring installed through continuous rows of fluorescent fixture bodies.

4. Fire alarm device wiring shall be 300 volt, PVC jacket UL–listed when routed in a raceway. The jacket shall be UL listed for use in air plenums when a raceway is not used.

5. Control wiring shall be No. 14 AWG copper conductor unless otherwise shown; 600 volt rated insulation.

6. Open low voltage wiring in return air plenums shall be plenum rated or run in conduit. All wiring in mechanical rooms electrical rooms and other areas subject to physical damage shall be run in conduit.

B. COLOR CODING: Conductors shall be color coded in accordance with the governing authority requirements or as follows:

120/208V	277/480V	120/240V
1. NEUTRAL: White.	1. Neutral: Gray	1. Neutral: White
2. PHASE A: Black.	2. Phase A: Brown	2. Phase A: Black
3. PHASE B: Red	3. Phase B: Purple	3. Phase B: Orange
4. PHASE C: Blue.	4. Phase C: Yellow	4. Phase C: Blue
5. GROUND: Green.	5. Ground: Green	5. Ground: Green

C. SPLICES:

Splices, where required, shall be fully made up in outlet boxes with compression crimp–on type splice connectors and at least 12 inches tagged end left for the fixture hanger. Where local requirements specify certain colors for phases and neutral, etc., these shall become the standard for this project.

Joints and splices will not be permitted in mains or feeder. Joints in branch circuits will be permitted where branch circuits divide, and then shall consist of one through–circuit to which the branch shall be spliced. Joints shall not be left for the fixture hanger to make. Fit joints and splices with Buchanan Series "2000" solderless connectors complete with insulating caps or properly sized wire nuts.

D. METAL CLAD CABLE – TYPE MC

1. At the contractor's option, metal clad cable (MC) may be used if approved by the authority having jurisdiction and building owner. The cable shall contain an insulated green grounding conductor (3 wire) and shall be the same size as the phase conductor. Conductors shall be solid copper.

2. Metal clad cable shall not be used for homeruns. Metal clad cable shall only be used for branch circuit drops from ceiling mounted junction boxes to outlets and for horizontal runs in a common wall from outlet to outlet. Do not route outlet to adjacent walls. Fixture to fixture wiring is acceptable in hard non–accessible ceilings.

3. Metal clad shall be UL approved connectors and shall be used and installed per Article 334 of the National Electrical Code.

2–6 WIRING DEVICES:

Acceptable manufacturers are Hubbell, or Pass & Seymour.

A. SWITCHES

Furnish and install generally where indicated on the Drawings. Coordinate final color and exact locations with architect.

Wall switches shall be 20 amp, 120–277 volt and shall be Hubbell Style Line Series 21 or equal as follows:

1. SINGLE POLE SWITCHES: 2121–W, White.

B. RECEPTACLES:

Furnish and install generally where indicated on the Drawings. Coordinate final color and exact location with architect.
Receptacles shall be Hubbell or equal as follows:
1. Duplex 20A–125V–self grounding: 2162–W (White, Nema configuration 5–20R).
2. Ground fault circuit interrupter (GFCI) receptacle 20A–125V; GF–5362–W. (White with indicator light Nema Configuration 5–20R, with "Feed through" connectors capable of protecting connected downstream receptacles on a single circuit, and of being installed in a 2–3/4" deep outlet box without adapter).
3. Equipment receptacles shall be coordinated with owner/manufacturer requirements and the correct and appropriate receptacle and cover plate then installed.

C. PLATES:

1. Provide Hubbell stainless steel type 302/304 coverplates
2. Indoor Exposed Raceway Systems: Stamped sheet metal, sized to match box without overlapping sharp edges.

Unless noted to the contrary on plans, or directed otherwise during the progress of the Work, wiring devices shall be set as follows:
1. Switches 42 inches above finished floor.
2. Duplex and single receptacles 18 inches above finish floor except where located above counters or interferes with shelving or as required by local codes.

2–7 GROUNDING:

Provide electrical service, equipment and wiring device grounding as shown, scheduled and as specified.

The types of grounding include, but are not limited to, the grounding bonding of all equipment devices, building steel piping, and as required by the National Electrical Code, Local Inspection Department and Power Company. A grounding conductor is required for all feeders and circuits.

Provide grounding products manufactured by Copperweld and Cadweld.

Ground rods shall be 3/4" inch diameter by 10 feet long construction with copper jacket and a steel core. Ground clamps shall be copper except for steel or iron pipes in which the clamps shall be galvanized iron. Conductors shall be connected by means of an approved pressure connector or clamp.

Perform a ground resistance test using a biddle megger. The system resistance shall not exceed 5 OHMS. Provide additional electrodes as required (refer to 250–84 of the NEC). Test shall not be conducted following wet weather. Provide personnel and instruments to conduct these tests and submit certified test for review.

A. BUILDING STEEL AND PIPING SYSTEM: Install a bonding jumper between building steel and metallic piping systems to bond them to the electrical grounding system.

B. NEUTRAL: The neutral shall be grounded only at the service entrance and other separately derived systems. The neutral shall be kept separate from the grounding system and shall not be used as a ground.

C. GROUNDING SEPARATELY DERIVED ALTERNATING CURRENT SYSTEM

TRANSFORMERS: The center point (neutral) of each wye connected transformer shall be bonded to the case and a grounding electrode conductor. The grounding electrode conductor shall be connected to building steel, a ground rod or the building grounding system, if building steel or ground rod are not possible.

D. GROUNDING CONDUCTOR: A grounding conductor and metallic conduit system shall bond all equipment served by the electrical system. Provide a flexible bonding jumper for isolated metallic piping and ductwork and around expansion fittings and joints.

E. CONDUIT GROUNDING BUSHING:

Conduit terminating in equipment that has a ground bus such as switchboards, panelboards, etc., shall have grounding bushings installed. Ground each conduit by means of a grounding bushing and to the ground bus in the equipment.

F. MOTORS: The frame of all motors shall grounded.

G. REMOTE PANELBOARDS: Provide a grounding electrode conductor at all remote panels as required by the NEC.

H. RECEPTACLES: All receptacle shall be grounded. Receptacles shall use an approved grounding yoke.

2–8 CURRENT – LIMITING FUSES:

Provide 200,000 amp interrupting capacity current limiting fuses of the ampacity and voltage indicated and scheduled.

Upon completion of the building the contractor shall provide the owner with spare fuses as shown below.

A. 10% (minimum of 3) of each type and rating of installed fuses shall be supplied as spares.

B. BUSSMAN spare fuse cabinets – Catalog No. SFC – shall be provided to store the above spares.

Mains, Feeders and Branch Circuits

1. Circuits 0 to 600 ampere shall be protected by current limiting BUSSMAN LOW–PEAK Dual Element Fuses LPN–RK (250 volts) or LPS–RK (600 volts). All dual–element fuses shall have separate overload and short–circuit elements. Fuse shall incorporate a spring activated thermal overload element having a 284 degree Fahrenheit melting point alloy and shall be independent of the short–circuited clearing chamber. The fuse must hold 500% of rated current for a minimum of 10 seconds and listed by Underwriters' Laboratories Inc., with an interrupting rating of 200,000 amperes r.m.s. symmetrical. The fuses shall be UL Class RK1.

2. Motor Circuits – All individual motor circuits rated 600 amperes or less shall be protected by BUSSMAN LOW–PEAK Dual Element Fuses LPN–RK (250 volts) or LPS–RK (600 volts). The fuses for 1.15 service factor motors shall be installed in ratings approximately 125% of motor full current except where high ambient temperatures prevail, or where the motor drives a heavy revolving part which cannot be brought up to full speed quickly, such as large fans. Under such conditions the fuse should be 150% to 200% of the motor full load current. Larger H.P. Motor shall be protected by BUSSMAN Type KRP–C Hi–CAP Time–Delay Fuses of the rating shown on the drawings. 1.0 service factor motors shall be protected by BUSSMAN LOW–PEAK Dual–Element Fuses LPN–RK (250 volts) or LPS–RK (600 volts) installed in ratings approximately 115% of the motor full load current except as noted above. The fuses shall be UL Class RK1 or L.

2–9 SAFETY AND DISCONNECT SWITCH:

A. Products shall be designed, manufactured, tested and installed in compliance with applicable standards.

1. NEMA KS1 – Enclosed switches
2. Federal specification W–S–865C–Heavy duty switches

Products shall conform all applicable UL standards, including UL98 (standard for safety, enclosed and dead front switches) and shall be UL–labeled.

Acceptable manufacturers are:

General Electric Company, Square D Company, or Siemens.

Furnish and install heavy–duty type safety switches with the number of switched poles as indicated on the plans and specifications. All safety switches shall be NEMA Heavy Duty Type HD, and Underwriters Laboratories listed.

B. Switch Interior

All switches shall have switchblades, which are fully visible in the "OFF" position when the door is open. Switches shall have removable arc suppressor where necessary, to permit easy access to line side lugs. Lugs shall be front removable and UL listed for 60°C and 75°C copper aluminum cables. All switches blades and contacts shall be plated copper.

C. Switch Mechanism

Switches shall have a quick–make and quick–break operating handle and mechanism, which shall be an integral part of the box, not the cover. Padlocking provisions shall be provided for locking in the "OFF" position with at least three padlocks. Switches shall have a dual cover interlock to prevent unauthorized opening of the switch door when the handle is in the "ON" position, and to prevent closing of the switch mechanism with the door open. A means shall be provided to permit authorized personnel to release the interlock for inspection purposes. Handle position shall indicate if switch is "ON" or "OFF".

D. Neutral

Provide a solid neutral with the safety switch where a neutral is present in the circuit.

E. Ratings

Switches shall be horsepower rated for ac and/or dc as indicated by the plans. The fused switches shall have Class R rejection fuse clips when required. Adjust load side terminal block as required to accept Class J fuses. UL listed short circuit ratings of the switches, when equipped with Class R or Class J fuses, shall be 200,000 symmetrical amperes.

F. Enclosures

1. Indoor switches shall be furnished in NEMA 1 enclosures.
2. Outdoor switches, switches located in wet areas, or inside a sprinkled area shall be furnished in NEMA 3R enclosures.

G. Service Entrance

Switch shall be suitable for use as service entrance equipment when installed in accordance with the National Electrical Code.

H. Hubs: Provide bolt–on hubs for rainproof or wet area applications.

2–10 LIGHTING FIXTURES:

All fixtures shall conform to all applicable UL standards and shall be UL label including damp and wet location ratings.

All fluorescent ballasts shall comply with certified ballast manufacture (CBM) standard and CBM labeled.

Acceptable manufacturers for ballasts are Advance Transformer Company or Magnetek Universal Manufacturing.

Acceptable manufacturers for lamps are General Electric Company, Osram–Sylvania or North American Philips. General Electric "Constant Color" is the only MR–16 lamp acceptable.

Provide the size, type and rating of each light fixture shown and scheduled. All light fixtures shall be complete with reflectors, lens, trim rings, flanges, lamps, lamp holders, ballast, starters, fuses wiring, earthquake clips, etc. to provide a complete functioning light fixture.

2–14 ELECTRICAL SERVICE ENTRANCE:

A. POWER SOURCE: UTILITY XFMR
B. SOURCE VOLTAGE: VARIES PER SITE

C. Field coordinate exact requirements and include in bid.

2–16 MISCELLANEOUS ELECTRICAL CONTROLS AND WIRING

A. The types of miscellaneous control devices and wiring include but not limited to the following.

1. Contactors
2. Relays
3. Time switches
4. Additional control wiring and safety devices as shown and specified.

Various control devices, of an electrical nature, for the safe operation and temperature control of the heating, ventilating, air conditioning and plumbing systems are provided under Division 15.

All control wiring and conduit shall be furnished under Division 15. All power wiring 120 volt or larger shall be provided by Division 16.

B. CONTACTORS AND RELAYS: Provide contactors and relays with the number of poles, ampere–rating, control wiring as required, is shown and specified for a complete function system. Acceptable manufacturers are General Electric Company, Square D Company, and Automatic Switch Company. Provide 2–wire or 3–wire control modules as required to operate lighting contactors. Contactors shall be mechanically held.

C. TIME SWITCHES: Provide motor driven, 7 day time clock with 24 hour reserve power feature installed in a NEMA 1 enclosure. Acceptable manufacturers are Tork, Inc., Intermatic time Controls, and AMF Paragon

D. Control wiring shall be not less than #14 AWG type TW, and shall be color coded and labeled with Brady markers throughout. Bundle multiple conductors with Ty–Raps.

END OF SECTION

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REVISION:

THE WOODLANDS TOWNSHIP
POOL PUMP AND CHEMICAL ROOM VENTILATION

DATE:
07/10/2014

DRAWN BY:
CC/JK

CHECKED BY:
KP/JK

PROJECT NUMBER
14134.000

DBR ENGINEERING CONSULTANTS
TBPE FIRM REGISTRATION NO. 2234

SHEET TITLE:
ELECTRICAL SPECIFICATIONS

SHEET NUMBER
E3.00

STATE OF TEXAS
AARON TABARES
117394
LICENSED
PROFESSIONAL ENGINEER
09/12/14

ABBREVIATIONS

A

A	AMPERES
ABV	ABOVE
A/C	AIR CONDITIONING
AC	ALTERNATING CURRENT, AIR COMPRESSOR, ABOVE COUNTER
ACC	AIR COOLED CHILLER
ACCU	AIR COOLED CONDENSING UNIT
AD	ACCESS DOOR
ADA	AMERICANS WITH DISABILITIES ACT
AF	AMPERE FUSE, AMPERE FRAME
AFC	ABOVE FINISHED CEILING
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHU	AIR HANDLING UNIT
AIC	AMPERE INTERRUPT CAPACITY
AL	ALUMINUM
AM	AMMETER
AMP	AMPLIFIER
ANN	ANNUNCIATOR
AP	ACCESS PANEL, ALARM PANEL
ARCH	ARCHITECT, ARCHITECTURAL
ASC	AMPERES SHORT CIRCUIT
AT	AMPERE TRIP RATING
ATS	AUTOMATIC TRANSFER SWITCH
AVG.	AVERAGE
AUX.	AUXILIARY

B

BC	BELOW COUNTER
BKR	BREAKER
BLDG.	BUILDING

C

C	CONDUIT, CELSIUS
CATV	CABLE TELEVISION SYSTEM
CCTV	CLOSED CIRCUIT TELEVISION
CWP	CONDENSER WATER PUMP
CH	CHILLER
CHP	CHILLED WATER PUMP
CIRC	CIRCULATING
CKT	CIRCUIT
CL	CENTERLINE
CLG.	CEILING
CMU	CONCRETE MASONRY UNIT
COL.	COLUMN
CONC	CONCRETE
CONN	CONNECTION
CONT.	CONTINUOUS,CONTINUATION
CONTR.	CONTROLLER, CONTRACTOR
CP.	CIRCULATING PUMP
CPUC	CPU CHILLER
CRT	CATHODE RAY TUBE
CRU	CONDENSATE RETURN UNIT
CT	CURRENT TRANSFORMER, COOLING TOWER
CTR	CENTER
CU	COPPER

D

dB	DECIBEL
DC	DIRECT CURRENT
DDC	DIRECT DIGITAL CONTROL
DTL	DETAIL
DIA	DIAMETER
DIM	DIMENSION
DISC	DISCONNECT
DN	DOWN
DP	DISTRIBUTION PANEL
DPDT	DOUBLE-POLE, DOUBLE-THROW
DPST	DOUBLE-POLE, SINGLE-THROW
DR	DROPPED RECEPTACLE
DW	DISHWASHER
DWG	DRAWING
DWH	DOMESTIC WATER HEATER
DWP	DOMESTIC WATER PUMP
DXFC	DX FAN COIL UNIT

E

(E)	EXISTING
EA	EACH
EC	ELECTRICAL CONTRACTOR
E.C.	EMPTY CONDUIT
EDF	ELECTRIC DRINKING FOUNTAIN
EF	EXHAUST FAN
EFF	EFFICIENCY
EHC	ELECTRIC HEATING COIL
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC.	ELECTRICAL
ELEV.	ELEVATOR
EMERG	EMERGENCY
EMS	ENERGY MANAGEMENT SYSTEM
ENCL	ENCLOSURE
ENGR.	ENGINEER
EPO	EMERGENCY POWER OFF
EQUIP	EQUIPMENT
(ER)	EXISTING TO REMAIN
EUH	ELECTRIC UNIT HEATER
EWH	ELECTRIC WATER HEATER
EXH	EXHAUST

F

F	FAHRENHEIT, FAN, FIRE
FA	FIRE ALARM
FACP	FIRE ALARM CONTROL PANEL
FCU	FAN COIL UNIT
FIXT	FIXTURE
FLA	FULL LOAD AMPS
FLEX	FLEXIBLE
FLR	FLOOR
FLUOR	FLUORESCENT
FP	FIRE PUMP, FAN POWERED
FRZR	FREEZER
FS	FUSED SWITCH, FLOW SWITCH
FSD	MOTORIZED FIRE SMOKE DAMPER
FT	FOOT, FEET
FTL	FEED-THRU LUGS
FUT	FUTURE
FVNR	FULL-VOLTAGE, NON-REVERSING

G

GA	GAGE
GAL	GALLON
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GEN	GENERATOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GND	GROUND
GUH	GAS UNIT HEATER

H

HACR	HEATING, AIR CONDITIONING RATED CIRCUIT BREAKER
HD	ELECTRIC HAND DRYER
HID	HIGH INTENSITY DISCHARGE
HOA	HAND-OFF-AUTOMATIC
HORIZ	HORIZONTAL
HP	HORSEPOWER
HPS	HIGH PRESSURE SODIUM
HS	HAND SET
HSC	HAND SCANNER
HTG	HEATING
HTR	HEATER
GUH	HOT WATER/ GAS UNIT HEATER
HVAC	HEATING, VENTILATING, AND AIR CONDITIONING
HVU	HEATING/ VENTILATING UNIT
HWB	HOT WATER BOILER
HWC	HOT WATER CIRCULATOR
HWP	HEATING WATER PUMP
H_z	HERTZ

I

ID	INSIDE DIAMETER
IG	ISOLATED GROUND
IN	INCH
INCAND	INCANDESCENT
INT	INTERNAL, INTERIOR

J

JB	JUNCTION BOX
JP	JOCKEY PUMP

K

KEC	KITCHEN EQUIPMENT CONTRACTOR
KO	KNOCKOUT
KVA	KILOVOLT- AMPS
KW	KILOWATT
KWH	KILOWATT-HOUR

L

LF	LINEAR FEET
LRA	LOCKED ROTOR AMPS
LTG	LIGHTING
LV	LOW VOLTAGE TRANSFORMER
LVL	LEVEL

M

M	METER
MAP	MASTER ALARM PANEL
MATV	MASTER ANTENNA TELEVISION SYSTEM
MAX.	MAXIMUM
MC	MECHANICAL CONTRACTOR
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MD	MOTORIZED DAMPER
MDP	MAIN DISTRIBUTION PANEL
MECH.	MECHANICAL
MFR	MANUFACTURER
MH	METAL HALIDE
MIC	MICROPHONE
MIN.	MINIMUM
MLO	MAIN LUGS ONLY
MSB	MAIN SWITCHBOARD
MTD	MOUNTED
MV	MERCURY VAPOR

N

N3R	NEMA 3R ENCLOSURE
N4X	NEMA 4X ENCLOSURE
N.C.	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
NF	NON-FUSED
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NFS	NON-FUSED SWITCH
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
N.O.	NORMALLY OPEN
NO.	NUMBER
NTS	NOT TO SCALE

O

OAF	OUTSIDE AIR FAN
OAHU	OUTSIDE AIR HANDLING UNIT
OC	ON CENTER
OD	OUTSIDE DIAMETER
OHE	OVERHEAD ELECTRICAL
OPG	OPENING

P

P	POLE, PUMP
PB	PUSHBUTTON
PC	PLUMBING CONTRACTOR
PH	PHASE
PL	PILOT LIGHT
PLBG	PLUMBING
PNEU	PNEUMATIC
PNL	PANEL
POS	POINT OF SALE
PP	POWER POLE
PR	PAIR
PRI	PRIMARY
PVC	POLYVINYL CHLORIDE
PWR	POWER

Q

QTY	QUANTITY

R

R	EXISTING TO BE REMOVED
RA	RETURN AIR
RAD	REFRIGERATED AIR DRYER
RAF	RETURN AIR FAN
RC	RECONNECT EXISTING DEVICE TO CIRCUIT INDICATED
RCP	REFLECTED CEILING PLAN
RCPT	RECEPTACLE
RE	REFERENCE, REFER
REC	RECEPTACLE
REFR	REFRIGERATOR
REINF	REINFORCING
REL	EXISTING TO BE RELOCATED
REL/EX	NEW LOCATION OF RELOCATED EQUIPMENT
REQD	REQUIRED
REV	REVISION, REVISE
RGS	RIGID GALVANIZED STEEL
RLA	RUNNING LOAD AMPS
RPM	REVOLUTIONS PER MINUTE
RR	REMOVE AND REPLACE
RTU	ROOFTOP UNIT

S

SA	SUPPLY AIR
SAF	SUPPLY AIR FAN
SCHED	SCHEDULE
SE	SEWAGE EJECTOR
SEC	SECONDARY
SECT	SECTION
SF	SQUARE FEET
SHT	SHEET
SIM	SIMILAR
SKVA	STARTING KILOVOLT-AMPS
SKW	STARTING KILOWATTS
SP	SUMP PUMP
SPEC	SPECIFICATION
SPF	STAIR PRESSURIZATION FAN
SPKR	SPEAKER
SPDT	SINGLE-POLE, DOUBLE-THROW
SPST	SINGLE-POLE, SINGLE-THROW
SQ.	SQUARE
SRF	SMOKE REMOVAL FAN
SS	START-STOP PUSH BUTTON
SSSC	SOLID STATE SPEED CONTROL
ST	SHUNT TRIP
STB	STEAM BOILER
STD	STANDARD
STL	STEEL
SURF	SURFACE
SW	SWITCH
SWBD	SWITCHBOARD

T

TC	TEMPERATURE CONTROL
TEL	TELEPHONE
TF	TRANSFER FAN
TL	TWIST-LOCK
TOC	TOP OF CURB
TOS	TOP OF STEEL
TP	CHILD TAMPER PROOF DEVICE
TSTAT	THERMOSTAT
TTB	TELEPHONE TERMINAL BOARD
TTC	TELEPHONE TERMINAL CABINET
TU	TERMINAL UNIT
TV	TELEVISION
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
TYP	TYPICAL

U

UG	UNDERGROUND
UH	UNIT HEATER
UL	UNDERWRITERS LABORATORIES, INC.
UNO	UNLESS NOTED OTHERWISE
UPS	UNINTERRUPTABLE POWER SYSTEM

V

V	VOLT
VA	VOLT-AMPERE
VC	VOLUME CONTROL
VERT	VERTICAL
VFD	VARIABLE FREQUENCY DRIVE
VP	VACUUM PUMP
VM	VOLT METER

W

W	WATT, WIRE, WIDTH
WG	WIREGUARD
W/	WITH
W/O	WITHOUT
WP	WEATHERPROOF
WS	WATER SOFTENER
WT	WATERTIGHT, WEIGHT
WWF	WELDED WIRE FABRIC

X

XFMR	TRANSFORMER

Z

Z	ZONE

ELECTRICAL SYMBOLS

MOTORS AND CONTROLS

- (5) — SINGLE OR THREE PHASE MOTOR NUMBER INDICATES HORSE POWER
- ELECTRIC DUCT HEATER
- DISCONNECT (SAFETY) SWITCH "200/3/150" DENOTES AMPERES/POLE/FUSE, "NF" DENOTES NON-FUSED "NJ3R" DENOTES NEMA 3R
- ENCLOSED CIRCUIT BREAKER- "200/3/150" DENOTES AMPERES/POLE/TRIP.
- MOTOR STARTER FURNISHED BY DIVISION 15 AND INSTALLED BY DIVISION 16.
- COMBINATION DISCONNECT (SAFETY) SWITCH AND MOTOR STARTER. "30/3/15/#2" DENOTES AMPERES/POLES/FUSE/ STARTER SIZE, "NF" DENOTES NON-FUSED. FURNISHED BY DIVISION 15 AND INSTALLED BY DIVISION 16.
- VFD — VARIABLE FREQUENCY DRIVE PROVIDED BY DIVISION 15 AND INSTALLED BY DIVISION 16.
- EPO — EMERGENCY POWER OFF BUTTON.

RECEPTACLES AND OUTLETS

ALL RECEPTACLES SHALL BE MOUNTED 16" ABOVE FINISHED FLOOR TO CENTER OF DEVICE UNLESS NOTED OTHERWISE.

- SIMPLEX WALL RECEPTACLE, NEMA 5-20R, 20A, 125V.
- DUPLEX WALL RECEPTACLE, NEMA 5-20R, 20A, 125V.
- "GFCI" DENOTES GROUND FAULT INTERRUPTER, "WP" DENOTES WEATHERPROOF,
- FOURPLEX (DOUBLE DUPLEX) WALL RECEPTACLE. NEMA 5-20R, 20A, 125V.
- R — FOURPLEX WALL RECEPTACLE ON EMERGENCY CIRCUIT, RED COLOR.
- SPECIAL RECEPTACLE, NEMA CONFIGURATION AS NOTED.

RACEWAYS AND WIRING

- CAP AND STAKE
- CONDUIT CONCEALED IN WALL OR CEILING
- CONDUIT UNDERSLAB OR UNDERGROUND
- EM — EMERGENCY CONDUIT
- EXPOSED CONDUIT
- UG — UNDERGROUND CONDUIT, "DB" DENOTES DUCTBANK ENCASED IN CONCRETE
- OHE — OVERHEAD ELECTRIC PRIMARY UTILITY POWER LINE
- CONDUIT TURNED UP
- CONDUIT TURNED DOWN
- HASH MARKS INDICATE NUMBER OF CONDUCTORS. LEFT TO RIGHT:PHASE,NEUTRAL,/SWITCH LEG,/GROUND,/ISOLATED GROUND. NO HASH MARKS INDICATES 2@ 12, PLUS GROUND, UNLESS NOTED OTHERWISE.
- 1LA-2,4 — HOMERUN TO PANEL WITH CIRCUIT NUMBER(S) AS INDICATED.
- (ON)1LA-6 — PARTIAL CIRCUIT HOMERUN TO PANEL.

ELECTRICAL EQUIPMENT

- DISTRIBUTION PANEL
- PANELBOARD (FLUSH/SURFACE MOUNT)
- FLOOR MOUNTED DRY-TYPE TRANSFORMER
- SUSPENDED OR WALL MOUNTED TRANSFORMER

COMMUNICATIONS

ALL RECEPTACLES SHALL BE MOUNTED 16" ABOVE FINISHED FLOOR TO CENTER OF DEVICE UNLESS NOTED OTHERWISE.

THE FOLLOWING NOTATIONS REFER TO ALL COMMUNICATIONS OUTLETS:
"FAX" DENOTES OUTLET DEDICATED FOR A FAX.
"M" DENOTES WALL PHONE SHALL BE MOUNTED AT 42" A.F.F.
"PAY" DENOTES PAY PHONE SHALL BE MOUNTED 42" A.F.F.

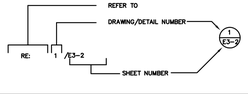
- TELEPHONE WALL OUTLET.
- DATA WALL OUTLET.
- VOICE/DATA OUTLET

SWITCHES

ALL SWITCHES SHALL BE MOUNTED AT 42" ABOVE FINISHED FLOOR TO CENTER OF DEVICE UNLESS NOTED OTHERWISE.

- $ — SWITCH, SPST, 20A, 120/277V.
- $_3$ — SWITCH, 20A, 120/277V. "3" DENOTES THREE-WAY,
- $_{MC}$ — SWITCH, SPDT, CENTER OFF, MOMENTARY CONTACT.
- $_M$ — MOTOR RATED SWITCH WITH THERMAL OVERLOADS

DRAWING/DETAIL REFERENCE KEY



GENERAL NOTES

A. NOT ALL SYMBOLS SHOWN ON THIS SYMBOL LIST ARE USED IN THE CONTRACT DOCUMENTS.

GENERAL ELECTRICAL SPECIFICATIONS

1. COMPLY WITH THE MOST RECENTLY REVISED VERSIONS OF ALL APPLICABLE RULES, REGULATIONS AND ORDINANCES ADOPTED BY THE WOODLANDS AUTHORITY AND AS PER 2008 NATIONAL ELECTRICAL CODE, NFPA-70.
2. CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH OWNER FOR ALL CONSTRUCTION STANDARDS AND SPECIFICATIONS, INCLUDING BUT NOT LIMITED TO STANDARD LIGHT FIXTURES, SWITCHES, RECEPTACLES, COVER PLATES, AND WIRING METHODS.
3. THE SCOPE OF THE ELECTRICAL WORK INCLUDES FURNISHING AND INSTALLING ALL ELECTRICAL WORK FOR A COMPLETE INSTALLATION.
4. IT IS THE RESPONSIBILITY OF THE CONTRACTOR OR CONTRACTORS TO VISIT THE SITE OF THE PROPOSED CONSTRUCTION IN ORDER TO FULLY UNDERSTAND THE FACILITIES, DIFFICULTIES AND RESTRICTION ATTENDING THE EXECUTION OF THE WORK. NO ADDITIONAL COMPENSATION WILL BE ALLOWED THIS CONTRACTOR FOR WORK OR ITEMS OMITTED FROM HIS ORIGINAL PROPOSAL DUE TO HIS FAILURE TO INFORM HIMSELF REGARDING SUCH MATTERS AFFECTING THE PERFORMANCE OF THE WORK IN THIS CONTRACT OR NECESSARY FOR THE INSTALLATION AND COMPLETION OF THE WORK INCLUDED HEREIN.
5. PROVIDE UPDATED, TYPED DIRECTORY FOR EACH PANEL BOARD, DESIGNATING NEW CIRCUITS AND SUITE BEING SERVED.
6. VERIFY ELECTRICAL REQUIREMENTS (IF ANY) FOR ANY SPECIAL EQUIPMENT PRIOR TO ANY WORK PERFORMED.
7. ALL RECEPTACLES TO BE MOUNTED A MINIMUM OF 16" A.F.F. AND ALL SWITCHES SHALL BE A MAXIMUM OF 42" A.F.F. UNLESS NOTED OTHERWISE. ALL DIMENSIONS ARE TO THE CENTERLINE. NEW DEVICE TYPES SHALL MATCH ORIGINAL BASE BUILDING STANDARDS WITH COLOR SELECTION BY ARCHITECT, UNLESS OTHERWISE NOTED.
8. CONTRACTOR SHALL PROVIDE EIGHT SETS OF SUBMITTALS ON ALL ELECTRICAL EQUIPMENT, INCLUDING, BUT NOT LIMITED TO, SWITCH GEAR, LIGHT FIXTURES, ELECTRICAL DEVICES, RACEWAYS.
9. ALL WIRING SHALL BE COPPER. ALUMINUM WIRING IS NOT ACCEPTABLE. MINIMUM WIRE SIZE IS #12 AWG. CONDUCTORS SIZED SHALL BE STRANDED. INSULATION SHALL BE "UL" TYPE THW OR THHN/THWN. METAL CLAD CABLE MAY BE USED FOR BRANCH CIRCUITS IF APPROVED BY THE AUTHORITY HAVING JURISDICTION.
10. MANUFACTURER AND CLASS OF ALL NEW DISTRIBUTION PANELS, LIGHTING PANELS, TRANSFORMERS, DISCONNECT SWITCHES, ELECTRIC SUB-METERS, ETC. SHALL MATCH ORIGINAL BUILDING ELECTRICAL GEAR. ALL BUSSING SHALL BE COPPER. ALUMINUM BUSSING IS NOT ACCEPTABLE. LOAD CENTERS ARE NOT ACCEPTABLE ALTERNATES FOR PANELBOARDS. ALL SAFETY SWITCHES ARE TO BE HEAVY DUTY TYPE
11. PROVIDE IDENTIFICATION OF ALL NEW PANEL BOARD AND DISTRIBUTION EQUIPMENT WITH ENGRAVED PHENOLIC PLASTIC LABEL SCREWED TO COVER. LABEL MUST IDENTIFY EQUIPMENT NAME, VOLTAGE AND PHASE, AMPACITY, AND SERVICE SOURCE.
12. ALL ELECTRICAL MATERIALS USED ON THIS PROJECT MUST BE U.L. LISTED AND LABELED.
13. CONTRACTOR SHALL COORDINATE WITH OTHER TRADES AND SUBCONTRACTORS TO PROVIDE A COMPLETE WORKING SYSTEM.
14. THIS CONTRACTOR SHALL FURNISH AND INSTALL ALL MOTOR STARTERS NOT PROVIDED WITH MECHANICAL OR PLUMBING EQUIPMENT.
15. THIS CONTRACTOR SHALL PROVIDE CONDUIT FOR CONTROL WIRING. COORDINATE WITH MECHANICAL CONTRACTOR.
16. COORDINATE WITH MECHANICAL AND PLUMBING DRAWINGS FOR EXACT EQUIPMENT LOCATION SUCH AS RTU'S, VAV'S, ACCU'S, HP'S, EF'S, WATER HEATERS, PUMPS ETC.
18. WHEN A LIFE SAFETY SYSTEM EXISTS, MAINTAIN THIS EXISTING SYSTEM IN ACCORDANCE WITH THE LOCAL CODES AND N.F.P.A., COORDINATING WITH BUILDING OWNER FOR APPROVED LIFE SAFETY CONTRACTOR.

GENERAL ELECTRICAL REMODELING NOTES:

1. WHEN OUTLETS ARE ABANDONED, WIRE MUST BE PULLED OUT OF CONDUIT BACK TO THE NEAREST REMAINING BOX OR CABINET AND EXPOSED CONDUIT, THAT HAS BEEN ABANDONED, MUST BE REMOVED.
2. REESTABLISH SERVICE TO ALL OUTLETS THAT MAY HAVE BEEN INTERRUPTED BECAUSE OF REMODELING WORK.
3. PROVIDE ALL APPURTENANCES REQUIRED TO REROUTE, RELOCATE, REMOVE, OR REINSTALL ALL ITEMS DESCRIBED IN THESE NOTES.
4. VERIFY THE LOADING OF EACH CIRCUIT AFFECTED BY REMODELING WORK. THE MAXIMUM LOAD OF ANY BRANCH CIRCUIT MUST NOT EXCEED 80% OF ITS RATING.
5. REMOVE ALL OUTLETS AND WIRING ASSOCIATED WITH ALL EQUIPMENT BEING REMOVED, INCLUDING MECHANICAL AND PLUMBING EQUIPMENT.

09/12/14

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REVISION:

THE WOODLANDS TOWNSHIP
POOL PUMP AND CHEMICAL ROOM VENTILATION

DATE: 07/10/2014
DRAWN BY: CC/JK
CHECKED BY: KP/JK
PROJECT NUMBER: 14134.000

DBR ENGINEERING CONSULTANTS
TBPE FIRM REGISTRATION NO. 2234

SHEET TITLE: ELECTRICAL SPECIFICATIONS

SHEET NUMBER: E3.01

PART I – GENERAL–MECHANICAL

1–1 DESCRIPTION

All work on these Drawings shall be done in strict accordance with these Specifications. The Work included under this Contract shall consist of the furnishing and installation of all equipment and material necessary and required to form the complete and functioning system in all of its various phases, all as shown on the accompanying drawings and/or described in these Specifications.

1–2 WARRANTY

The Contractor shall guarantee the work for a period of one year beyond date of final acceptance. During that period, the Contractor shall repair or replace, at his own expense, any faults or imperfections that may arise due to defects in material and workmanship, including the loss of refrigerant and/or oil due to leaks. Defects shall include but not be limited to noisy operation, loose or missing parts, or noticeable deterioration of finish. During the period, the Contractor shall actually perform all service work required, including the servicing of air filters. All air conditioning compressors shall have parts and labor guarantees for a period of not less than 5 years beyond the date of final acceptance.

1–3 PROJECT CONDITIONS

The Contractor shall visit the Site of the Work and fully understand the conditions that affect the work, or the cost thereof, understand the existing utilities from which services will be supplied, verify locations of utility services, determine requirements for connections, and determine in advance that equipment and materials proposed for installation fit into the confines indicated.

1–4 PERMITS AND FEES

The Contractor shall arrange and pay for all permits, fees, test, and all inspections as required by Governmental Authorities.

1–5 COORDINATION WITH FIELD CONDITIONS

The Contract Documents are schematic in nature in that they are only to establish "Scope" and a minimum level of quality. All duct or pipe or equipment locations as indicated on the Documents do not indicate every transition, offset, or exact location. All transitions, offsets, and exact locations shall be established by actual field measurements and coordination with the structural, architectural and reflected ceiling plans. All transitions, offsets, and relocations as required by actual field conditions shall be performed by the Contractor at no additional cost to the Owner.

1–6 SUBMITTALS

Contractor shall provide six sets of Shop Drawings and Submittals on all Mechanical equipment, insulation, air devices, ductwork (flexible and rigid), and thermostats. Any deviations from the specified items shall be listed on the cover sheet and clearly itemized for all deviations. The Contractor shall provide two copies of Owner's Manual to the Architect upon completion of the Work.

1–7 QUALITY ASSURANCE

All Work shall be performed in accordance with all State, Local, and Federal Codes and all Authorities and Jurisdiction.

1–8 EQUIPMENT IDENTIFICATION

All Mechanical equipment shall be identified by means of nameplates permanently attached to the equipment. Nameplates shall be engraved laminated plastic or etched metal.

1–9 TESTING AND BALANCING

Testing and balance shall be provided by the Mechanical Sub–Contractor, with the services of an Independent Test and Balance Agency. The Test and Balance Company shall specialize in such work, and be a member of Associated Air Balance Council (AABC). The forms used shall be based on recommendations of AABC. Upon completion of the Balancing and Testing, the Balancing Contractor shall compile the test data in report forms, and forward five copies to the Architect for evaluation. The final report shall contain logged results of all tests, including such data as:

Tabulation of air volume at each outlet. (Balanced to within 5% design).

Outside dry bulb and wet bulb temperature.

Inside dry bulb and wet bulb temperatures in each conditioned space room or area.

Actual fan capacities, RPM's and static pressures. Motor current and voltage readings at each fan.

Entering and leaving air temperatures, DB and WB.

PART II – DUCTWORK–MECHANICAL

2–1 METAL DUCTWORK

All ductwork shall be properly suspended or supported from the building structure. Hangers shall be galvanized steel straps or hot–dipped galvanized rod with thread pointed after installation. Strap hangers shall be attached to the bottom of the ductwork. The spacing, size and installation hangers shall be in accordance with the recommendations of latest edition of SMACNA space hangers as required to support ducts without sagging.

Ventlock No. 699 "Test Plugs" shall be provided in ductwork at all openings in ductwork required for testing and balancing.

2–1–1 DUCTWORK MATERIALS

Exposed Ductwork Materials: Where ductwork is indicated to be exposed to view in occupied spaces provide materials which are free from visual imperfections including pitting, seam marks, roller marks, stains, discolorations, and other imperfections, including those which would impair painting.

Sheet Metal: Except as otherwise indicated, fabricate ductwork from galvanized sheet, sheet complying with ASTM A527, lockforming quality, with G90 zinc coating in accordance with ASTM A 525; and mill phoshatized for exposed locations.

Stainless Steel Sheet: Where indicated, provided stainless steel complying with ASTM A167; Type 316; with No. 4 finish where exposed to view in occupied spaces, No. 1 finish elsewhere. Protect finished surfaces with mill–applied adhesive protective paper, maintained through fabrication and installation.

Aluminum Sheet: Where indicated, provide aluminum sheet complying with ASTM B209, Alloy 3003, Temper H14.

A. Non combustible and conforming to UL 181, Class 1 air duct materials.

B. Flexible ducts: Flexmaster U.S.A. Inc. Type 3M or approved equal, corrosive resistance galvanized steel formed and Mechanically locked to inner fabric with 1 inch thick insulation when flexible ducts are located in conditioned spaces and with R–6 insulation when located in unconditioned spaces. Flexible duct shall have reinforced metalized outer jacket comply with UL 181, Class 1 air duct.

C. Sealants: Hard–Cast "Iron Grip" or approved equal, non–hardening, water resistant, fire resistive and shall not be a solvent curing product. Sealants shall be compatible with mating materials, liquid used alone or with tape or heavy mastic.

D. Ductwork Support Materials: Except as otherwise indicated, provide hot–dipped galvanized steel fasteners, anchors, rods, straps, trim and angles for support of ductwork.

1. For exposed stainless steel ductwork, provide matching stainless steel support materials.
2. For aluminum ductwork, provide aluminum support materials.

2–1–2 LOW PRESSURE DUCTWORK

A. Fabricate and support in accordance with latest SMACNA low pressure duct construction standards and ASHRAE handbooks, except as indicated. Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.

B. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts. No variation of duct configuration or sizes permitted except by approved shop drawings. Obtain engineer's approval prior to using round duct in lieu of rectangular duct.

C. Construct T's, bends, and elbows with radius of not less than 1 ½ times width of duct on centerline. Where not possible and where rectangular elbows are used, provide airfoil–turning vanes. Where acoustical lining is indicate, provide turning vanes of perforated metal with glass fiber insulation.

D. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible. Divergence upstream of equipment shall not exceed 30 degrees; convergence downstream shall not exceed 45 degrees.

E. Use crimp joints with bead for joining round duct sizes 6 inch smaller with crimp in direction of airflow.

F. Use double nuts and lock washers on threaded rod supports.

2–1–3 EXECUTION

A. Obtain Manufacturer's Inspection and acceptance of fabrication and installation of ductwork at beginning of installation.

B. Provide openings in ductwork where required to accommodate thermometers and controllers. Provide Pitot tube openings where required for testing of systems, complete with metal can with spring device or screw to ensure against air leakage where openings are provided in insulated ductwork, install insulation material inside a metal ring.

C. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.

D. Connect diffusers to low pressure ducts with 6 feet maximum, 4 feet minimum, length of flexible duct. Hold in place with strap or clamp.

E. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

F. The interior surface of all ductwork shall be smooth. No sheet metal parts, tabs, angles, or anything else may project into the ducts for any reason, except as specified to be so. All seams and joints shall be external.

G. All ductwork located exposed on roof shall be "Crowned" to prevent water from ponding. Reference insulation for additional requirements.

H. Where ducts pass through floors, provide structural angles for duct support. Where ducts pass through walls in exposed areas, install suitable sheet metal escutcheons as closers.

I. All angles shall be carried around all four sides of the duct or group of ducts. Angles shall overlap corners and be welded or riveted.

J. All ductwork shall be fabricated in a manner to prevent the seams or joints being cut for the installation of grilles, registers, or ceiling outlets.

2–1–4 INSTALLATION OF FLEXIBLE DUCTS

A. Maximum length: For any duct run using flexible ductwork, do not exceed 6'–0" extended length.

B. Installation: Install in accordance with Section 3 of SMACNA's, "HVAC duct construction standards, metal and flexible".

C. Provide spin–in fitting for all round flexible duct connections to rectangular duct. Spin–in fittings shall be factory fabricated and include an air extractor scoop and a balancing butterfuly damper with a locking quadrant and handle. Balancing shall be at the spin–in fitting and not at the air distribution device.

2–1–5 DUCTWORK HANGERS AND SUPPORTS

A. All ductwork shall be properly suspended or supported from the building structure. Hangers shall be galvanized steel straps or hot–dipped galvanized rod with threads pointed after installation. Strap hanger shall be attached to the bottom of the ductwork. Provide a minimum of two screws one at the bottom and one in the side of each strap on metal ductwork. The spacing, size and installation of hangers shall be in accordance with the recommendations of the latest SMACNA Edition.

B. All duct risers shall be supported by angles or channels secured to the sides of the ducts at each floor with sheet metal screws or rivets. The floor supports may also be secured to ducts by rods, angles or flat bar to the duct joint or reinforcing. Structural steel supports for duct risers shall be provided under this division.

2–1–6 DUCT EXPOSED IN POOL ROOM

A. Eighteen gauge minimum galvanized steel

B. Two coat galv–grip primer.

C. Three coat minimum, acid resistant epoxy paint, minimum 6 MIL dry film thickness total, exterior of duct, color to be selected by Architect in the field.

D. Paint after fabrication, including all hangers, taps, grilles, return air grilles and louvers.

2–2 DUCT INSULATION

All insulation shall be installed in accordance with the Manufacturer's recommendations and printed installation instructions.

All items required for a complete and proper installation are not necessarily indicated on the Plans or in the Specifications. Provide all items required as per manufacturer's requirements.

2–2–1 EXTERNAL DUCT INSULATION

A. Fasten all longitudinal and circumferential laps with outward clinching staples 3" on center. On rectangular ducts over 24" wide apply as above and hold insulation in place on bottom side with mechanical pins and clips on 12" centers.

B. Seal all joints, fastener penetrations and other breaks in vapor barrier with 3 inch wide strips of white glass fabric embedded between two coats of vapor barrier mastic, childers CP–30 or approved equal.

C. All external duct insulation shall be Johns Manville Type 75 fiberglass duct wrap insulation with reinforced aluminum facing or approved equal.

D. External duct wrap is required on all outside air ducts and supply air ducts that are not internally insulated. Duct wrap shall be provided as follows:

1. 1 ½ " thick, 1/0 PCF density minimum when ducts are located in conditioned spaces.
2. 2" thick with a minimum installed R–value of 6 when ducts are located in unconditioned spaces, such as ceiling plenum space.

2–2–2 DUCT LINER

A. Duct liner shall be kept clean and dry during transportation, storage and installation. Care should be taken to protect the liner from exposure to the elements or damage from mechanical abuse.

B. All portions of duct designed to receive duct liner shall be completely covered with liner as specified. The smooth, black, acrylic–coated surfaces with flexible glass cloth reinforcement shall face the airstream. All duct liner shall be cut to assure tight, overlapped corner joints. The top pieces shall be supported by the sidepieces. Duct liner shall be installed following the guidelines in the NAIMA "Duct Liner Installation Standard".

C. The duct liner shall be tested according to erosion test method in UL 181 and shall be guaranteed to withstand velocities in the duct system up to 5000 FPM without surface erosion.

D. Duct liner shall be adhered to the sheet metal with full coverage of an approved adhesive that conforms to ASTM C 916, and all exposed leading edges and transverse joints shall be coated with permacote factory–applied or field–applied edge coating and shall be neatly butted without gaps. Shop or field cuts shall be liberally coated with Johns Manville Superseal? Duct butter and edge treatment or approved adhesive.

E. Metal nosings shall be securely installed over transversely oriented liner edges facing the airstream at forward discharge and at any point where lined duct is preceded by unlined duct.

F. When velocity exceeds 4000 FPM (20.3 M/SEC), use metal nosing on every leading edge. Nosing may be formed on duct or be channel or zee attached by screws, rivets or welds.

G. The liner shall further be secured with graham welding pins and washers on not more than 18 inch centers both vertical and horizontal surfaces, and the pins and washers shall be pointed up with adhesive.

H. Duct liner shall be Johns Manville Linacoustic RC fiberglass duct liner with factory–applied edge coating or approved equal. The liner shall meet the life safety standards as established by NFPA 90A and 90B, FHC 25/50 and limited combustibility and the air stream surface coating should contain an immobilized, EPA–registered, anti microbial agent so it will not support microbial growth as tested in accordance with ASTM G21 and G22, the duct liner shall conform to the requirements of ASTM C 423 using a Type "A" mounting, and a thermal conductivity no higher than .25 BTUIN/(HRFT2F) at 75F mean temperature.

I. Duct liner is required on all return air ductwork, return air boots and supply air ductwork downstream of the terminal units. Duct liner shall be provided as follows:

1. 1" thick, 1.5 PCF density minimum when ducts are located in conditioned spaces.
2. 1 ½ " thick with a minimum installed R–value of 6 when ducts are located in unconditioned spaces, such as ceiling plenum space.
3. 2" thick with a minimum installed R–value of 8 when ducts are located outdoors.

J. Line supply and return ductwork at connection of HVAC unit to a point of 15 feet upstream and downstream of the equipment with John Manville, linacoustic RC with an R–value of 6 or approved equal for thermal insulation and noise control. The liner shall meet the safety standards as indicated above with NRC not less than 0.75 as tested per ASTM C423 using a Type "A" mounting and thermal conductivity no higher than 0.24 BTUIN/(HRFT2F) at 75F mean temperature. Attach with full cover coat of cement, duct dimensions up to 16 inches, provide stick clips or screws and cap for dimension over 16 inches, space 16 inches O.C. maximum. Provide sheet metal liner cap over all leading edges of internal insulation exposed to air stream.

2–2–3 AIR DEVICE AND MISCELLANEOUS DUCT INSULATION

A. The backside of all supply air devices shall be insulated with taped and sealed 1 ½ inch thick external duct wrap.

B. The Contractor shall install an additional layer of 1 ½ inch thick external fiberglass duct wrap on any portion of the supply air, return air, outside air, or exhaust air system that has condensation forming during any period of operation. The insulation shall be taped and sealed and located until all evidence of the condensation had been eliminated at no additional cost to the owner.

PART III: EQUIPMENT – MECHANICAL

3–1 AIR DISTRIBUTION

A. Air distribution devices shall be selected at a maximum of 30 noise criteria and at a maximum of 0.06" W.G. total pressure drop. Approved Manufacturers are Metalaire, Price, Titus, and Krueger.

B. The backside of all supply air devices shall be insulated with taped and sealed 1–½" thick one lb. density fiberglass insulation with vapor barrier.

3–4 FANS

A. The following Manufacturers are approved subject to Specification Compliance: Greenheck, Cook, Breidert, ACME, Penn.

B. All fans shall be tested in accordance with latest AMCA Fan Test Code shall bear AMCA certified rating seal.

C. All fans with V–belt drives shall have statically and dynamically balanced adjustable sheaves with drive capacity not less than 150% of the nominal motor horsepower. Adjustable drives as Manufactures by Browning, Gates, or Goodrich will be acceptable.

D. All motors shall be selected so that they will not overload if the static pressure drops one–half inch. Motor Controller will be furnished by this division, unless noted otherwise on the plans. Refer to drowings fro 2–speed fan motor requirements. Provide fan guard for all wall mounted fans.

E. Fans shall be installed as detailed on drawings and in accordance with Manufacturer's recommendations. Fans moving 2,000 CFM and more shall have smoke detector installed in ductwork or other suitable location to detect products of combustion and shut–off fan.

3–3 AIR FILTERS

A. The following Manufacturers are approved subject to Specification Compliance: American Air Filter, Air Guard Industries Inc., and Cambridge.

B. The filters shall be Farr 30/30 2 inch thick or approved equal.

3–4 AUTOMATIC TEMPERATURE CONTROLS

A. All existing controls and thermostats found to be non–operational shall be repaired or replaced.

END OF SECTION

1 M3.00 MECHANICAL SPECIFICATIONS

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REVISION:

THE WOODLANDS TOWNSHIP
POOL PUMP AND CHEMICAL ROOM VENTILATION

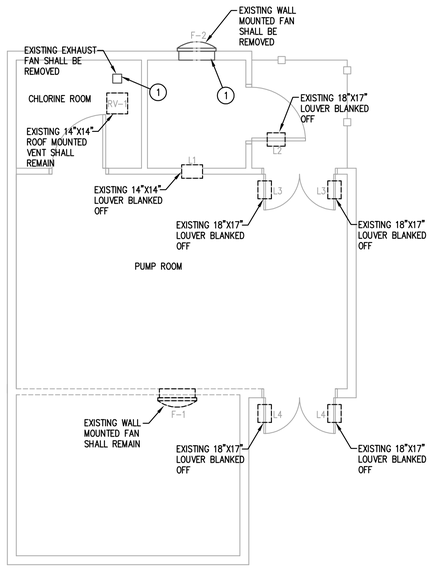
DATE: 07/10/2014
DRAWN BY: CC/JK
CHECKED BY: KP/JK
PROJECT NUMBER 14134.000

DBR ENGINEERING CONSULTANTS
TBPE FIRM REGISTRATION NO. 2234

SHEET TITLE: MECHANICAL SPECIFICATIONS

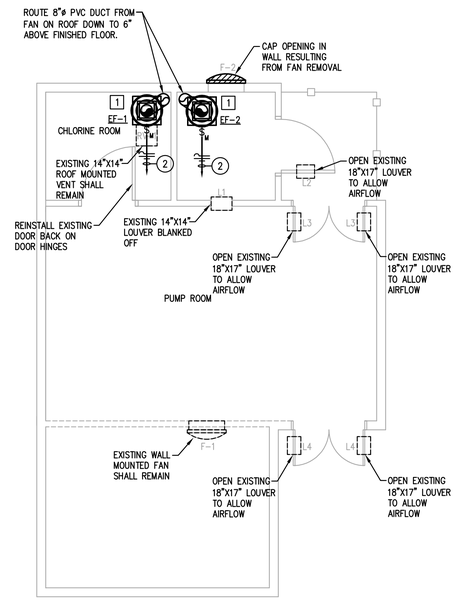
SHEET NUMBER: M3.00

STATE OF TEXAS
KEVIN A. PFEIFFER
96819
LICENSED
PROFESSIONAL ENGINEER
9/11/2014



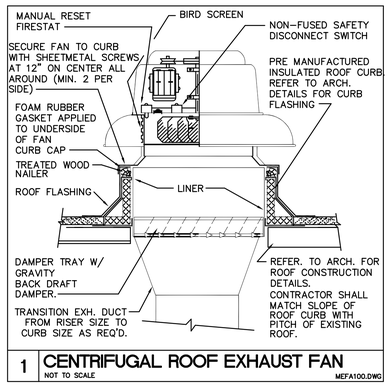
1 MEP1.01 **MEP EXISTING PLAN - BEAR BRANCH POOL**

1/4"=1'-0"



2 MEP1.01 **MEP PROPOSED PLAN - BEAR BRANCH POOL**

1/4"=1'-0"



1 **CENTRIFUGAL ROOF EXHAUST FAN**

NOT TO SCALE

MEFA100.DWG

FAN SCHEDULE	
MARK	EF-1, EF-2
SERVES	BEAR BRANCH POOL
TYPE/DRIVE	ROOF/DIRECT
CFM	200
EXT. S.P. (IN. W.G.)	0.50
HORSEPOWER	1/20
FAN RPM (MAX.)	1,550
DBA (MAX.)	55.0
VOLTS/PHASE/HERTZ	115/1/60
MANUFACTURER	GREENHECK
MODEL NUMBER	CUE-080-D
NOTES	1, 2

NOTES:
1. PROVIDE FAN WITH PRE-FABRICATED ROOF CURB.
2. PROVIDE FAN WITH WEATHERPROOF DISCONNECT SWITCH AND BACKDRAFT DAMPER.

MECHANICAL GENERAL NOTES

1. CONTRACTOR SHALL COORDINATE WITH STRUCTURAL CONDITIONS AT THE SITE AND PROVIDE ALL CLEARANCES AS INDICATED.
2. CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR FOR ALL ELECTRICAL POWER REQUIREMENTS.
3. PROVIDE INSULATION FOR ALL DUCTWORK THAT MEETS THE 2009 IECC ENERGY CODE AS SPECIFIED.

MECHANICAL KEYED NOTES

[1] PROVIDE AND INSTALL EXHAUST FAN MOUNTED ON ROOF. CONNECT EXHAUST DUCT RISER TO FAN. PROVIDE TRANSITION AS REQUIRED. RE: DETAIL 1.

ELECTRICAL GENERAL NOTES:

A. OWNER SHALL RESERVE RIGHT TO CLAIM ALL DEVICES REMOVED DURING DEMOLITION.

B. ALL EQUIPMENT SHOWN IS EXISTING TO REMAIN UNLESS NOTED OTHERWISE.

C. CONTRACTOR SHALL FIELD VERIFY INTEGRITY OF ANY CONDUCTORS NOTED TO BE REUSED. ANY CONDUCTORS DETERMINED TO BE FAULTY SHALL BE REPLACED.

ELECTRICAL KEYED NOTES:

(1) EXISTING EXHAUST FAN SHALL BE REMOVED. REMOVE ASSOCIATED DISCONNECT SWITCH. EXISTING CONDUIT AND WIRING SHALL REMAIN. CONTRACTOR SHALL COIL AND PROTECT CONDUCTORS FOR CONNECTION TO NEW EQUIPMENT.

(2) CONNECT NEW EXHAUST FAN TO CIRCUIT MADE AVAILABLE AFTER DEMOLITION OF EXISTING EXHAUST FAN.

STATE OF TEXAS
AARON TABARES
117394
LICENSED
PROFESSIONAL ENGINEER

09/12/14

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REVISION:

THE WOODLANDS TOWNSHIP
POOL PUMP AND CHEMICAL ROOM VENTILATION

DATE: 07/10/2014

DRAWN BY: CC/JK

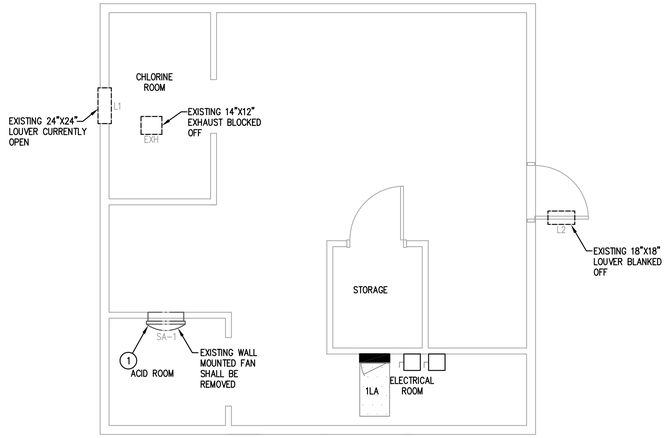
CHECKED BY: KP/JK

PROJECT NUMBER: 14134.000

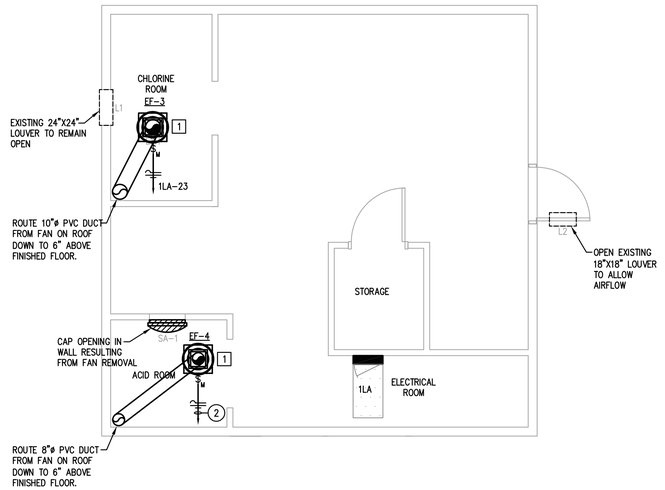
DBR ENGINEERING CONSULTANTS
TBPE FIRM REGISTRATION NO. 2234

SHEET TITLE: BEAR BRANCH MEP PLANS, DETAILS AND SCHEDULES

SHEET NUMBER: MEP1.01



1 MEP EXISTING PLAN - ALDINE BRIDGE POOL
MEP1.02 — 1/4"=1'-0"



2 MEP PROPOSED PLAN - ALDINE BRIDGE POOL
MEP1.02 — 1/4"=1'-0"

Lighting Class Panelboard 1LA

10,000 AIC Rating
X Existing
New

240 Volt,1-Phase,3-Wire
Section 1 of 1
1 -Nema Rating

X MCB
MLO

200 AMP MCB
AMP BUS (Copper)
100 ISO. GRND. BUS

X Single
Double
Feed - Thru

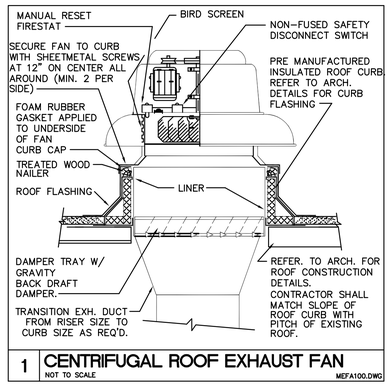
Mounting
X Surface
Flush

Notes	Load (VA)	Description	Type	Wire	CB	CKT #	PH	CKT #	CB	Wire	Type	Description	Load (VA)	Notes
		EXISTING LOAD		12	15/1	1	A	2	15/1	12		EXISTING LOAD		
		EXISTING LOAD		12	15/1	3	C	4	20/1	12		EXISTING LOAD		
		EXISTING LOAD		12	15/1	5	A	6	15/1	12		EXISTING LOAD		
		EXISTING LOAD		12	20/1	7	C	8	20/1	12		EXISTING LOAD		
		EXISTING LOAD		12	20/1	9	A	10	20/2	12		EXISTING LOAD		
		EXISTING LOAD		12	20/1	11	C	12	-	12		-		
		EXISTING LOAD		12	20/1	13	A	14	20/2	12		EXISTING LOAD		
		EXISTING LOAD		12	20/1	15	C	16	-	12		-		
		EXISTING LOAD		12	15/1	17	A	18	20/2	12		EXISTING LOAD		
		EXISTING LOAD		12	15/2	19	C	20	-	12		-		
		-		12	-	21	A	22	40/2	8		EXISTING LOAD		
	161	EF-3		12	15/1	23	C	24	-	8		-		
		SPACE				25	A	26				SPACE		
		SPACE				27	C	28				SPACE		
		SPACE				29	A	30				SPACE		
		SPACE				31	C	32				SPACE		
		SPACE				33	A	34				SPACE		
		SPACE				35	C	36				SPACE		
		SPACE				37	A	38				SPACE		
		SPACE				39	C	40				SPACE		
		SPACE				41	A	42				SPACE		
	161	Subtotal										Subtotal	0	

N.E.C.	Load Type	Conn.	Fct.	Diversity	N.E.C.		Conn.	Fct.	Diversity
220.44	(R) Recept.	0		0	210.20(a)	(L) Lighting	0	125%	0
220.56	(K) Kitchen	0	100%	0		(EL) Ext. Ltg.	0	125%	0
220.60	(C) Cooling	0	0%	0	620.14	(E) Elevators	0	100%	0
220.60	(H) Heating	0	0%	0		(WH) Water Ht.	0	100%	0
220.60	(F) Fans	0	100%	0	220.5	(MT) Lrg. Mot.	0	125%	0
	(M) Misc.	0	100%	0		(SP) Sub Panel	0	100%	0

Total Connected Load 0 VA = 0.0 AMPS
Total Load (Diversified 0 VA = 0.0 AMPS

Location of Panel:



1 CENTRIFUGAL ROOF EXHAUST FAN
NOT TO SCALE — MEFA100.DWG

FAN SCHEDULE		
MARK	EF-3	EF-4
SERVES	ALDINEBRIDGE	ALDINEBRIDGE
TYPE/DRIVE	ROOF/DIRECT	ROOF/DIRECT
CFM	275	200
EXT. S.P. (IN. W.G.)	0.60	0.50
HORSEPOWER	1/20	1/20
FAN RPM (MAX.)	1,550	1,550
DBA (MAX.)	55.0	55.0
VOLTS/PHASE/HERTZ	115/1/60	115/1/60
MANUFACTURER	GREENHECK	GREENHECK
MODEL NUMBER	CUE-085-D	CUE-080-D
NOTES	1, 2	1, 2

NOTES:
1. PROVIDE FAN WITH PRE-FABRICATED ROOF CURB.
2. PROVIDE FAN WITH WEATHERPROOF DISCONNECT SWITCH AND BACKDRAFT DAMPER.

MECHANICAL GENERAL NOTES

1. CONTRACTOR SHALL COORDINATE WITH STRUCTURAL CONDITIONS AT THE SITE AND PROVIDE ALL CLEARANCES AS INDICATED.
2. CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR FOR ALL ELECTRICAL POWER REQUIREMENTS.
3. PROVIDE INSULATION FOR ALL DUCTWORK THAT MEETS THE 2009 IECC ENERGY CODE AS SPECIFIED.

MECHANICAL KEYED NOTES

[1] PROVIDE AND INSTALL EXHAUST FAN MOUNTED ON ROOF. CONNECT EXHAUST DUCT RISER TO FAN. PROVIDE TRANSITION AS REQUIRED. RE: DETAIL 1.

ELECTRICAL GENERAL NOTES:

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B. ALL EQUIPMENT SHOWN IS EXISTING TO REMAIN UNLESS NOTED OTHERWISE.

C. CONTRACTOR SHALL FIELD VERIFY INTEGRITY OF ANY CONDUCTORS NOTED TO BE REUSED. ANY CONDUCTORS DETERMINED TO BE FAULTY SHALL BE REPLACED.

ELECTRICAL KEYED NOTES:

(1) EXISTING EXHAUST FAN SHALL BE REMOVED. REMOVE ASSOCIATED DISCONNECT SWITCH. EXISTING CONDUIT AND WIRING SHALL REMAIN. CONTRACTOR SHALL COIL AND PROTECT CONDUCTORS FOR CONNECTION TO NEW EQUIPMENT.

(2) CONNECT NEW EXHAUST FAN TO CIRCUIT MADE AVAILABLE AFTER DEMOLITION OF EXISTING EXHAUST FAN.

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REVISION:

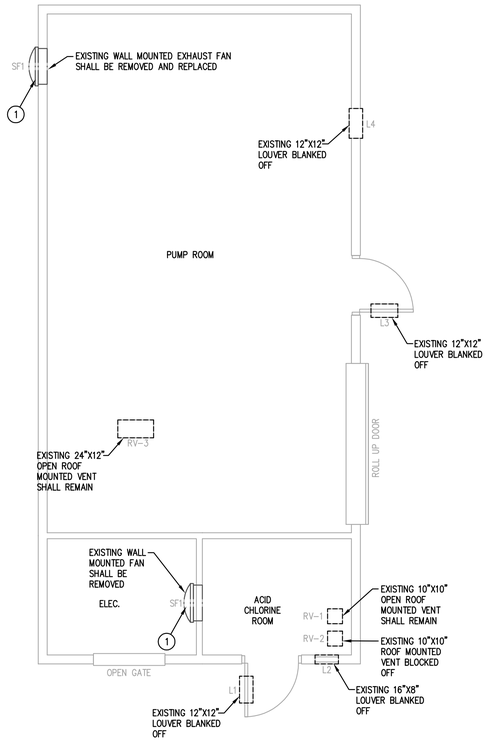
THE WOODLANDS TOWNSHIP
POOL PUMP AND CHEMICAL ROOM VENTILATION

DATE: 07/10/2014
DRAWN BY: CC/JK
CHECKED BY: KP/JK
PROJECT NUMBER 14134.000

DBR ENGINEERING CONSULTANTS
TBPE FIRM REGISTRATION NO. 2234

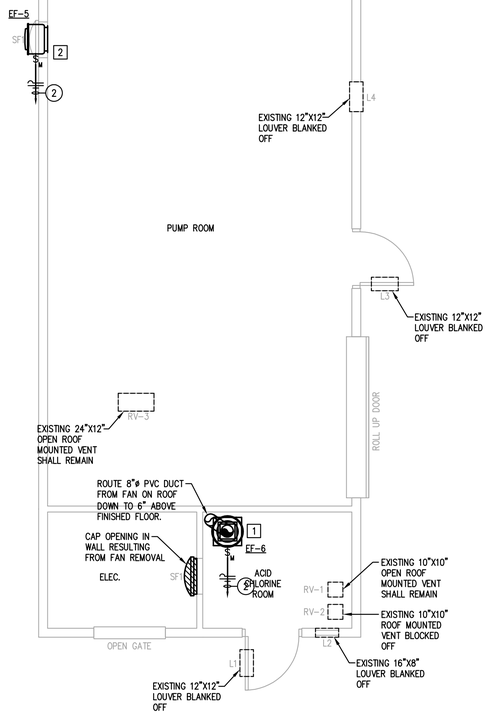
SHEET TITLE:
ALDINE BRIDGE MEP PLANS, DETAILS AND SCHEDULES

SHEET NUMBER
MEP1.02



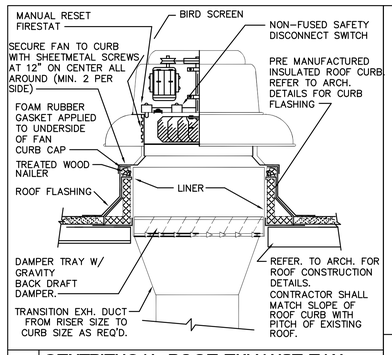
1 MEP1.03 MEP EXISTING PLAN - CRANEBROOK POOL

1/4"=1'-0"

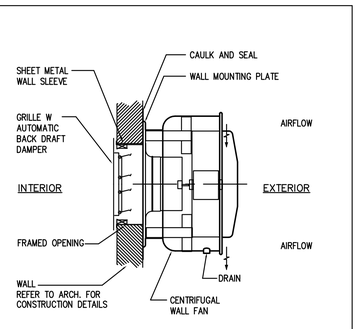


2 MEP1.03 MEP PROPOSED PLAN - CRANEBROOK POOL

1/4"=1'-0"



1 CENTRIFUGAL ROOF EXHAUST FAN
NOT TO SCALE MEFA100.DWG



2 CENTRIFUGAL WALL EXHAUST FAN
NOT TO SCALE MEFA103.DWG

FAN SCHEDULE		
MARK	EF-5	EF-6
SERVES	CRANEBROOK	CRANEBROOK
TYPE/DRIVE	SIDEWALL/DIRECT	ROOF/DIRECT
CFM	750	200
EXT. S.P. (IN. W.G.)	0.50	0.50
HORSEPOWER	1/8	1/20
FAN RPM (MAX.)	1,550	1,550
DBA (MAX.)	57.0	55.0
VOLTS/PHASE/HERTZ	115/1/60	115/1/60
MANUFACTURER	GREENHECK	GREENHECK
MODEL NUMBER	CW-095-D	CUE-080-D
NOTES	1, 2	1, 2

NOTES:
1. PROVIDE FAN WITH PRE-FABRICATED ROOF CURB.
2. PROVIDE FAN WITH WEATHERPROOF DISCONNECT SWITCH AND BACKDRAFT DAMPER.

MECHANICAL GENERAL NOTES

1. CONTRACTOR SHALL COORDINATE WITH STRUCTURAL CONDITIONS AT THE SITE AND PROVIDE ALL CLEARANCES AS INDICATED.
2. CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR FOR ALL ELECTRICAL POWER REQUIREMENTS.
3. PROVIDE INSULATION FOR ALL DUCTWORK THAT MEETS THE 2009 IECC ENERGY CODE AS SPECIFIED.

MECHANICAL KEYED NOTES

[1] PROVIDE AND INSTALL EXHAUST FAN MOUNTED ON ROOF. CONNECT EXHAUST DUCT RISER TO FAN. PROVIDE TRANSITION AS REQUIRED. RE: DETAIL 1.

[2] PROVIDE AND INSTALL EXHAUST FAN MOUNTED ON WALL. CONNECT EXHAUST DUCT RISER TO FAN. PROVIDE TRANSITION AS REQUIRED. RE: DETAIL 2.

ELECTRICAL GENERAL NOTES:

A. OWNER SHALL RESERVE RIGHT TO CLAIM ALL DEVICES REMOVED DURING DEMOLITION.

B. ALL EQUIPMENT SHOWN IS EXISTING TO REMAIN UNLESS NOTED OTHERWISE.

C. CONTRACTOR SHALL FIELD VERIFY INTEGRITY OF ANY CONDUCTORS NOTED TO BE REUSED. ANY CONDUCTORS DETERMINED TO BE FAULTY SHALL BE REPLACED.

ELECTRICAL KEYED NOTES:

(1) EXISTING EXHAUST FAN SHALL BE REMOVED. REMOVE ASSOCIATED DISCONNECT SWITCH. EXISTING CONDUIT AND WIRING SHALL REMAIN. CONTRACTOR SHALL COIL AND PROTECT CONDUCTORS FOR CONNECTION TO NEW EQUIPMENT.

(2) CONNECT NEW EXHAUST FAN TO CIRCUIT MADE AVAILABLE AFTER DEMOLITION OF EXISTING EXHAUST FAN.

09/12/14

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REVISION:

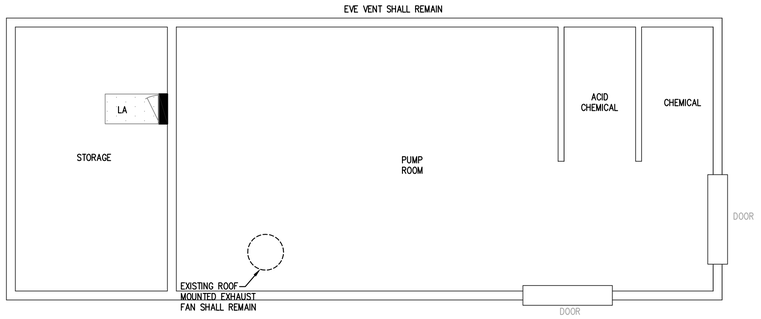
THE WOODLANDS TOWNSHIP
POOL PUMP AND CHEMICAL ROOM VENTILATION

DATE: 07/10/2014
DRAWN BY: CC/JK
CHECKED BY: KP/JK
PROJECT NUMBER: 14134.000

DBR ENGINEERING CONSULTANTS TBPE FIRM REGISTRATION NO. 2234

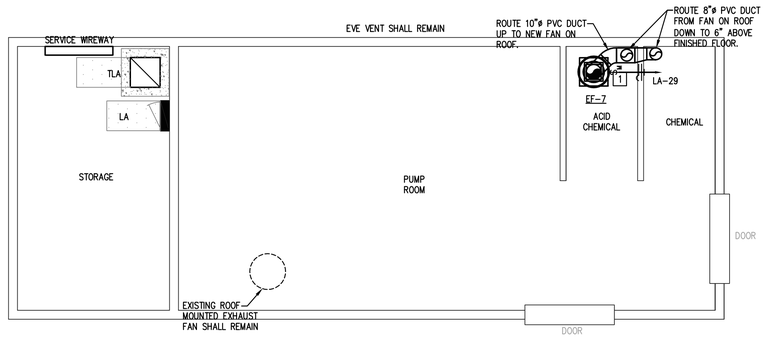
SHEET TITLE:
CRANEBROOK MEP PLANS, DETAILS AND SCHEDULES

SHEET NUMBER
MEP1.03



1 MEP1.04 MEP EXISTING PLAN - CREEKWOOD POOL

1/4"=1'-0"



2 MEP1.04 MEP PROPOSED PLAN - CREEKWOOD POOL

1/4"=1'-0"

Lighting Class Panelboard LA

10,000 AIC Rating
X Existing
New

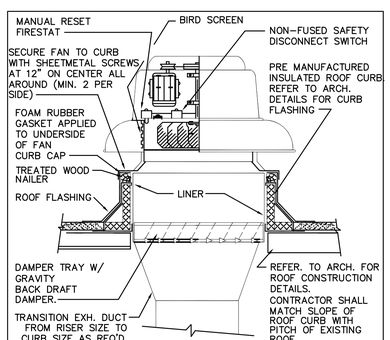
120/240 Volt,3-Phase,4-Wire 2 Section 1 -Nema Rating			X MCB MLO		150 AMP MCB 100 AMP BUS (Copper) (SO, GRND, BUS				Single X Double Feed - Thru			Mounting X Surface Flush	
Notes	Load (VA)	Description	Type	Wire	CB	CKT #	PH	CKT #	CB	Wire	Type	Description	Load (VA)	Notes
		EXISTING LOAD		12	20/1	1	A	2	20/1	12		EXISTING LOAD		
		EXISTING LOAD		12	20/1	3	B	4	20/1	12		EXISTING LOAD		
		EXISTING LOAD		12	20/1	5	C	6	20/1	12		EXISTING LOAD		
		EXISTING LOAD		12	20/1	7	A	8	20/1	12		EXISTING LOAD		
		EXISTING LOAD		12	20/2	9	B	10	20/2	12		EXISTING LOAD		
		EXISTING LOAD		12	20/1	11	C	12	-	12		-		
		EXISTING LOAD		12	20/1	13	A	14	20/2	12		EXISTING LOAD		
		EXISTING LOAD		12	20/2	15	B	16		12		-		
		-		12	-	17	C	18	40/2	8		EXISTING LOAD		
		EXISTING LOAD		12	30/2	19	A	20	-	8		-		
		-		12	-	21	B	22	20/1	12		EXISTING LOAD		
		EXISTING LOAD		12	20/1	23	C	24	20/1	12		EXISTING LOAD		
		EXISTING LOAD		12	20/1	25	A	26	20/2	12		EXISTING LOAD		
		EXISTING LOAD		12	20/1	27	B	28	-	12		-		
	100	EF-7		12	15/1	29	C	30	20/1			EXISTING LOAD		
		SPACE				31	A	32				SPACE		
		SPACE				33	B	34				SPACE		
		SPACE				35	C	36				SPACE		
		SPACE				37	A	38				SPACE		
		SPACE				39	B	40				SPACE		
		SPACE				41	C	42				SPACE		
	6,440	Subtotal										Subtotal	6,920	

N.E.C.	Load Type	Conn.	Fct.	Diversity	N.E.C.		Conn.	Fct.	Diversity
220.44	(R) Recept.	11,220		10,610	210.20(a)	(L) Lighting	0	125%	0
220.55	(K) Kitchen	0	100%	0		(EL) Ext. Ltg.	0	125%	0
220.60	(C) Cooling	0	0%	0	620.14	(E) Elevators	0	100%	0
220.60	(H) Heating	0	0%	0		(WH) Water Ht.	0	100%	0
220.60	(F) Fans	0	100%	0	220.5	(MT) Lrg. Mot.	0	125%	0
	(M) Misc.	1,500	100%	1,500		(SP) Sub Panel	0	100%	0

Total Connected Load 12,720 VA = 30.7 AMPS
Total Load (Diversified 12,110 VA = 29.2 AMPS
Location of Panel:

FAN SCHEDULE	
MARK	EF-7
SERVES	CREEKWOOD PARK
TYPE/DRIVE	ROOF/DIRECT
CFM	400
EXT. S.P. (IN. W.G.)	0.60
HORSEPOWER	1/15
FAN RPM (MAX.)	1,550
DBA (MAX.)	54.0
VOLTS/PHASE/HERTZ	115/1/60
MANUFACTURER	GREENHECK
MODEL NUMBER	CUE-090-D
NOTES	1, 2

NOTES:
1. PROVIDE FAN WITH PRE-FABRICATED ROOF CURB.
2. PROVIDE FAN WITH WEATHERPROOF DISCONNECT SWITCH AND BACKDRAFT DAMPER.



1 CENTRIFUGAL ROOF EXHAUST FAN

NOT TO SCALE MEFA100.DWG

MECHANICAL GENERAL NOTES

1. CONTRACTOR SHALL COORDINATE WITH STRUCTURAL CONDITIONS AT THE SITE AND PROVIDE ALL CLEARANCES AS INDICATED.
2. CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR FOR ALL ELECTRICAL POWER REQUIREMENTS.
3. PROVIDE INSULATION FOR ALL DUCTWORK THAT MEETS THE 2009 IECC ENERGY CODE AS SPECIFIED.

MECHANICAL KEYED NOTES

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ELECTRICAL GENERAL NOTES:

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STATE OF TEXAS
AARON TABARES
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LICENSED PROFESSIONAL ENGINEER
09/12/14

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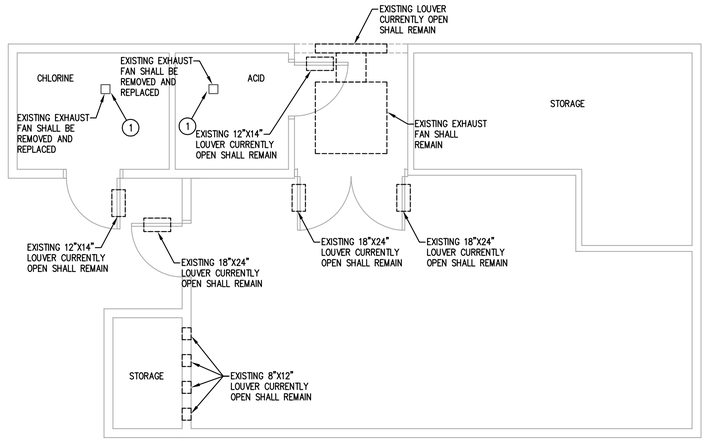
PROJECT NUMBER: 14134.000

DBR ENGINEERING CONSULTANTS
TBPE FIRM REGISTRATION NO. 2234

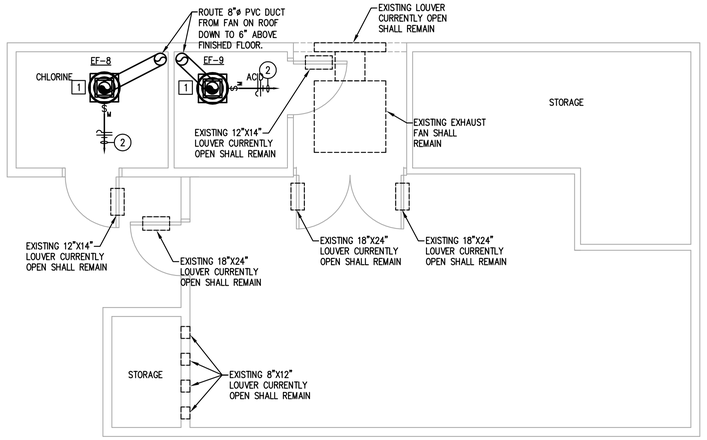
SHEET TITLE:
CREEKWOOD MEP PLANS, DETAILS AND SCHEDULES

SHEET NUMBER
MEP1.04



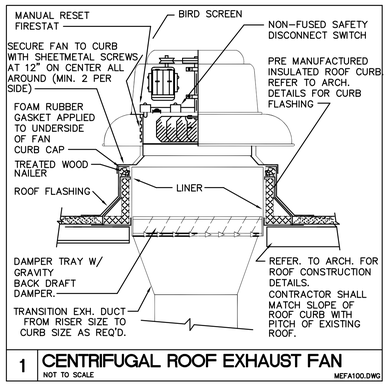
1 MEP1.05 **MEP EXISTING PLAN - FALCONWING POOL**

1/4"=1'-0"



2 MEP1.05 **MEP PROPOSED PLAN - FALCONWING POOL**

1/4"=1'-0"



1 **CENTRIFUGAL ROOF EXHAUST FAN**

NOT TO SCALE MEFA100.DWG

FAN SCHEDULE	
MARK	EF-8, EF-9
SERVES	FALCONWING
TYPE/DRIVE	ROOF/DIRECT
CFM	200
EXT. S.P. (IN. W.G.)	0.50
HORSEPOWER	1/20
FAN RPM (MAX.)	1,550
DBA (MAX.)	55.0
VOLTS/PHASE/HERTZ	115/1/60
MANUFACTURER	GREENHECK
MODEL NUMBER	CUE-080-D
NOTES	1, 2

NOTES:
1. PROVIDE FAN WITH PRE-FABRICATED ROOF CURB.
2. PROVIDE FAN WITH WEATHERPROOF DISCONNECT SWITCH AND BACKDRAFT DAMPER.

MECHANICAL GENERAL NOTES

1. CONTRACTOR SHALL COORDINATE WITH STRUCTURAL CONDITIONS AT THE SITE AND PROVIDE ALL CLEARANCES AS INDICATED.
2. CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR FOR ALL ELECTRICAL POWER REQUIREMENTS.
3. PROVIDE INSULATION FOR ALL DUCTWORK THAT MEETS THE 2009 IECC ENERGY CODE AS SPECIFIED.

MECHANICAL KEYED NOTES

[1] PROVIDE AND INSTALL EXHAUST FAN MOUNTED ON ROOF. CONNECT EXHAUST DUCT RISER TO FAN. PROVIDE TRANSITION AS REQUIRED. RE: DETAIL 1.

ELECTRICAL GENERAL NOTES:

A. OWNER SHALL RESERVE RIGHT TO CLAIM ALL DEVICES REMOVED DURING DEMOLITION.

B. ALL EQUIPMENT SHOWN IS EXISTING TO REMAIN UNLESS NOTED OTHERWISE.

C. CONTRACTOR SHALL FIELD VERIFY INTEGRITY OF ANY CONDUCTORS NOTED TO BE REUSED. ANY CONDUCTORS DETERMINED TO BE FAULTY SHALL BE REPLACED.

ELECTRICAL KEYED NOTES:

(1) EXISTING EXHAUST FAN SHALL BE REMOVED. REMOVE ASSOCIATED DISCONNECT SWITCH. EXISTING CONDUIT AND WIRING SHALL REMAIN. CONTRACTOR SHALL COIL AND PROTECT CONDUCTORS FOR CONNECTION TO NEW EQUIPMENT.

(2) CONNECT NEW EXHAUST FAN TO CIRCUIT MADE AVAILABLE AFTER DEMOLITION OF EXISTING EXHAUST FAN.

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AARON TABARES
117394
LICENSED
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09/12/14

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REVISION:

THE WOODLANDS TOWNSHIP
POOL PUMP AND CHEMICAL ROOM VENTILATION

DATE: 07/10/2014

DRAWN BY: CC/JK

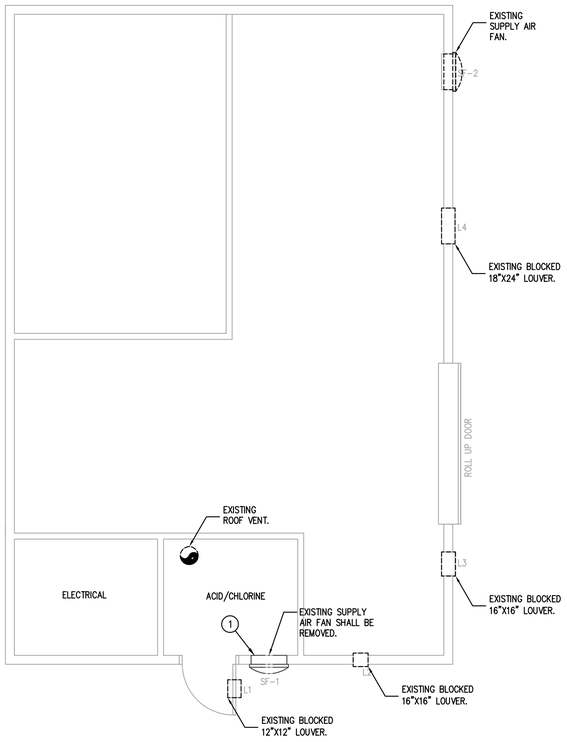
CHECKED BY: KP/JK

PROJECT NUMBER: 14134.000

DBR ENGINEERING CONSULTANTS
TBPE FIRM REGISTRATION NO. 2234

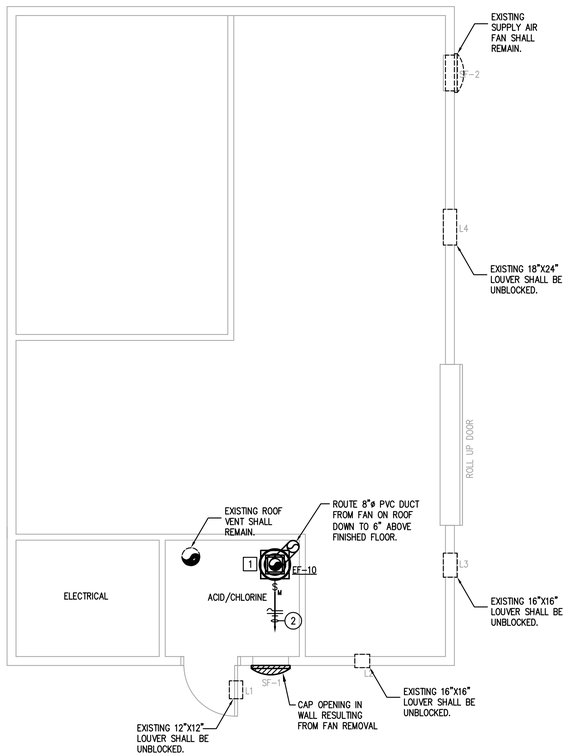
SHEET TITLE: FALCONWING MEP PLANS, DETAILS AND SCHEDULES

SHEET NUMBER: MEP1.05



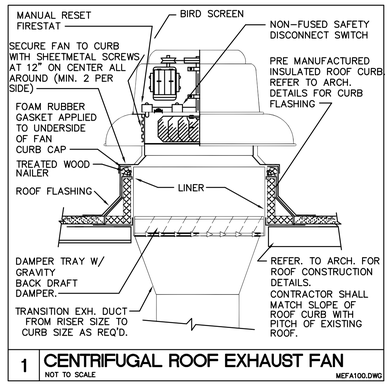
1 MEP1.06 MEP EXISTING PLAN - FORESTGATE POOL

1/4"=1'-0"



2 MEP1.06 MEP PROPOSED PLAN - FORESTGATE POOL

1/4"=1'-0"



1 CENTRIFUGAL ROOF EXHAUST FAN

NOT TO SCALE MEFA100.DWG

FAN SCHEDULE	
MARK	EF-10
SERVES	FORESTGATE
TYPE/DRIVE	ROOF/DIRECT
CFM	200
EXT. S.P. (IN. W.G.)	0.50
HORSEPOWER	1/20
FAN RPM (MAX.)	1,550
DBA (MAX.)	55.0
VOLTS/PHASE/HERTZ	115/1/60
MANUFACTURER	GREENHECK
MODEL NUMBER	CUE-080-D
NOTES	1, 2

NOTES:
1. PROVIDE FAN WITH PRE-FABRICATED ROOF CURB.
2. PROVIDE FAN WITH WEATHERPROOF DISCONNECT SWITCH AND BACKDRAFT DAMPER.

MECHANICAL GENERAL NOTES

1. CONTRACTOR SHALL COORDINATE WITH STRUCTURAL CONDITIONS AT THE SITE AND PROVIDE ALL CLEARANCES AS INDICATED.
2. CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR FOR ALL ELECTRICAL POWER REQUIREMENTS.
3. PROVIDE INSULATION FOR ALL DUCTWORK THAT MEETS THE 2009 IECC ENERGY CODE AS SPECIFIED.

MECHANICAL KEYED NOTES

[1] PROVIDE AND INSTALL EXHAUST FAN MOUNTED ON ROOF. CONNECT EXHAUST DUCT RISER TO FAN. PROVIDE TRANSITION AS REQUIRED. RE: DETAIL 1.

ELECTRICAL GENERAL NOTES:

A. OWNER SHALL RESERVE RIGHT TO CLAIM ALL DEVICES REMOVED DURING DEMOLITION.

B. ALL EQUIPMENT SHOWN IS EXISTING TO REMAIN UNLESS NOTED OTHERWISE.

C. CONTRACTOR SHALL FIELD VERIFY INTEGRITY OF ANY CONDUCTORS NOTED TO BE REUSED. ANY CONDUCTORS DETERMINED TO BE FAULTY SHALL BE REPLACED.

ELECTRICAL KEYED NOTES:

(1) EXISTING EXHAUST FAN SHALL BE REMOVED. REMOVE ASSOCIATED DISCONNECT SWITCH. EXISTING CONDUIT AND WIRING SHALL REMAIN. CONTRACTOR SHALL COIL AND PROTECT CONDUCTORS FOR CONNECTION TO NEW EQUIPMENT.

(2) CONNECT NEW EXHAUST FAN TO CIRCUIT MADE AVAILABLE AFTER DEMOLITION OF EXISTING EXHAUST FAN.

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REVISION:

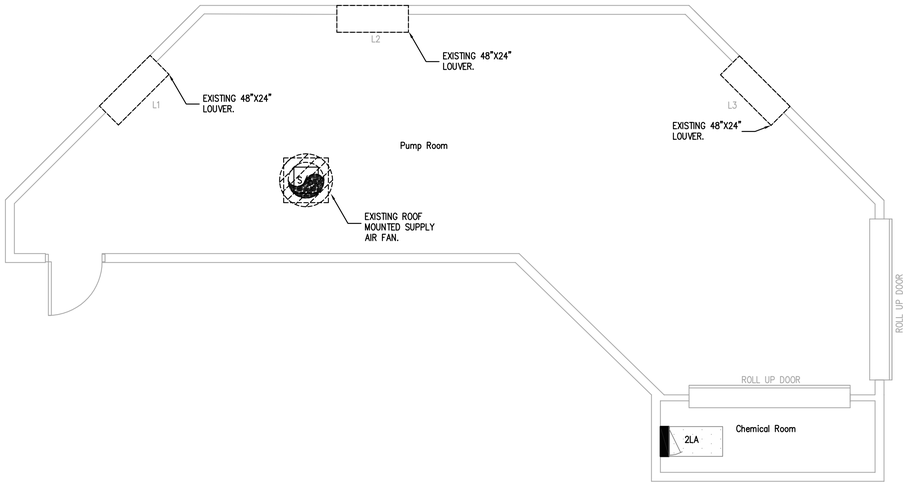
THE WOODLANDS TOWNSHIP
POOL PUMP AND CHEMICAL ROOM VENTILATION

DATE: 07/10/2014
DRAWN BY: CC/JK
CHECKED BY: KP/JK
PROJECT NUMBER: 14134.000

DBR ENGINEERING CONSULTANTS
TBPE FIRM REGISTRATION NO. 2234

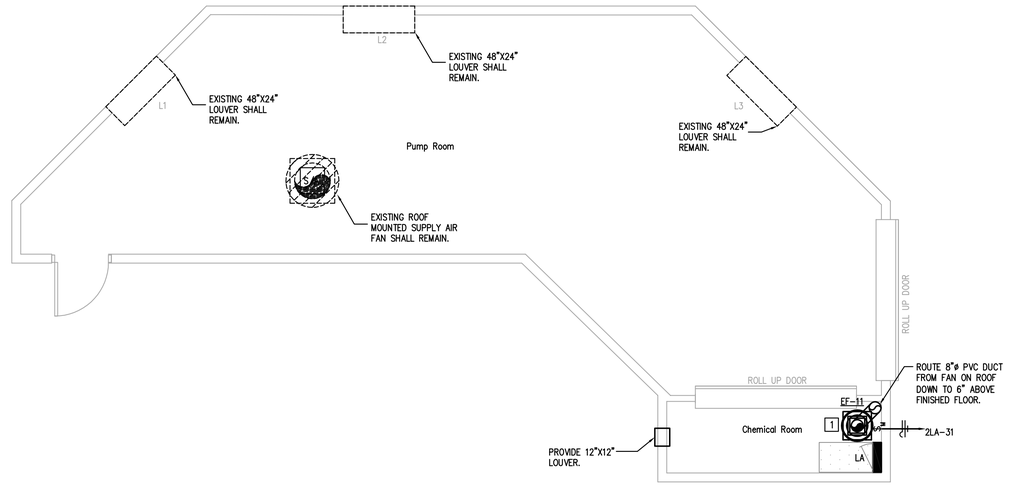
SHEET TITLE: FORESTGATE MEP PLANS, DETAILS AND SCHEDULES

SHEET NUMBER: MEP1.06



1 MEP1.07 MEP EXISTING PLAN - HARPER'S LANDING POOL

1/4"=1'-0"



2 MEP1.07 MEP PROPOSED PLAN - HARPER'S LANDING POOL

1/4"=1'-0"

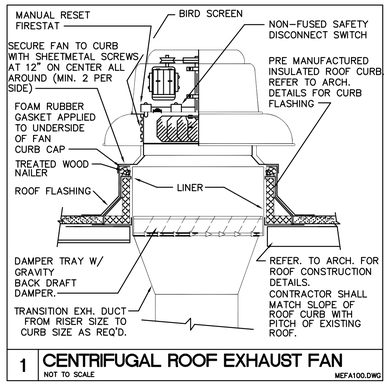
Lighting Class Panelboard LA — 10,000 AIC Rating; X Existing; New

120/240 Volt,3-Phase,4-Wire; 1 Section; 1 -Nema Rating	X MCB; MLO	225 AMP MCB; AMP BUS (Copper); 100 ISO. GRND. BUS	Single; Double; X Feed - Thru	Mounting: X Surface; Flush

Notes	Load (VA)	Description	Type	Wire	CB	CKT #	PH	CKT #	CB	Wire	Type	Description	Load (VA)	Notes
		EXISTING LOAD		12	20/1	1	A	2	30/3	10		EXISTING LOAD		
		EXISTING LOAD		12	20/1	3	B	4	-	10		-		
		EXISTING LOAD		12	20/1	5	C	6	-	10		-		
		EXISTING LOAD		12	20/1	7	A	8	30/3	10		EXISTING LOAD		
		SPACE				9	B	10	-	10		-		
		EXISTING LOAD		12	20/1	11	C	12	-	10		-		
		EXISTING LOAD		12	20/1	13	A	14	20/3	12		EXISTING LOAD		
		EXISTING LOAD		12	20/1	15	B	16	-	12		-		
		-		12	20/1	17	C	18	-	12		-		
		EXISTING LOAD		12	20/1	19	A	20	20/1	12		EXISTING LOAD		
		-		12	20/1	21	B	22	20/1	12		EXISTING LOAD		
		EXISTING LOAD		12	20/2	23	C	24	20/1	12		EXISTING LOAD		
		-		12	-	25	A	26	20/3	12		EXISTING LOAD		
		EXISTING LOAD		12	20/2	27	B	28	-	12		-		
		-		12	-	29	C	30	-	12		-		
	100	EF-11		12	15/1	31	A	32	60/2	12		EXISTING LOAD		
		SPACE				33	B	34	-	12		-		
		SPACE				35	C	36				SPACE		
		SPACE				37	A	38				SPACE		
		SPACE				39	B	40				SPACE		
		SPACE				41	C	42				SPACE		
	6,440	Subtotal										Subtotal	6,920	

N.E.C.	Load Type	Conn.	Fct.	Diversity	N.E.C.		Conn.	Fct.	Diversity
220.44	(R) Recept.	11,220		10,610	210.20(a)	(L) Lighting	0	125%	0
220.56	(K) Kitchen	0	100%	0		(EL) Ext. Ltg.	0	125%	0
220.60	(C) Cooling	0	0%	0	620.14	(E) Elevators	0	100%	0
220.60	(H) Heating	0	0%	0		(WH) Water Ht.	0	100%	0
220.60	(F) Fans	0	100%	0	220.5	(MT) Lrg. Mot.	0	125%	0
	(M) Misc.	1,500	100%	1,500		(SP) Sub Panel	0	100%	0

Total Connected Load 12,720 VA = 30.7 AMPS
Total Load (Diversified 12,110 VA = 29.2 AMPS
Location of Panel:



1 CENTRIFUGAL ROOF EXHAUST FAN
NOT TO SCALE MEFA100.DWG

FAN SCHEDULE	
MARK	EF-11
SERVES	HARPERLANDING
TYPE/DRIVE	ROOF/DIRECT
CFM	200
EXT. S.P. (IN. W.G.)	0.50
HORSEPOWER	1/20
FAN RPM (MAX.)	1,550
DBA (MAX.)	55.0
VOLTS/PHASE/HERTZ	115/1/60
MANUFACTURER	GREENHECK
MODEL NUMBER	CUE-080-D
NOTES	1, 2

NOTES:
1. PROVIDE FAN WITH PRE-FABRICATED ROOF CURB.
2. PROVIDE FAN WITH WEATHERPROOF DISCONNECT SWITCH AND BACKDRAFT DAMPER.

MECHANICAL GENERAL NOTES

1. CONTRACTOR SHALL COORDINATE WITH STRUCTURAL CONDITIONS AT THE SITE AND PROVIDE ALL CLEARANCES AS INDICATED.
2. CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR FOR ALL ELECTRICAL POWER REQUIREMENTS.
3. PROVIDE INSULATION FOR ALL DUCTWORK THAT MEETS THE 2009 IECC ENERGY CODE AS SPECIFIED.

MECHANICAL KEYED NOTES

[1] PROVIDE AND INSTALL EXHAUST FAN MOUNTED ON ROOF. CONNECT EXHAUST DUCT RISER TO FAN. PROVIDE TRANSITION AS REQUIRED. RE: DETAIL 1.

ELECTRICAL GENERAL NOTES:

A. OWNER SHALL RESERVE RIGHT TO CLAIM ALL DEVICES REMOVED DURING DEMOLITION.

B. ALL EQUIPMENT SHOWN IS EXISTING TO REMAIN UNLESS NOTED OTHERWISE.

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REVISION-

THE WOODLANDS TOWNSHIP POOL PUMP AND CHEMICAL ROOM VENTILATION

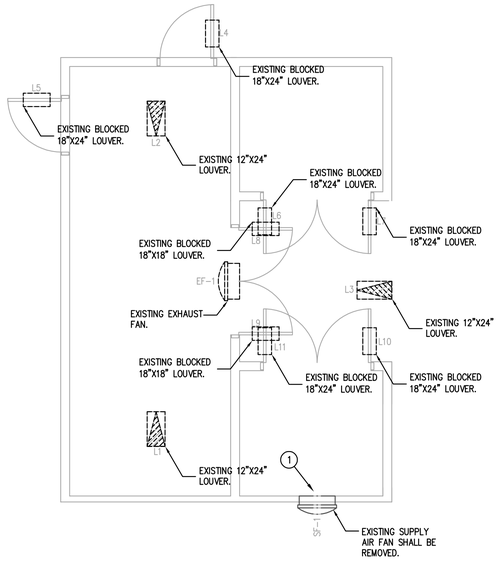
DATE: 07/10/2014
DRAWN BY: CC/JK
CHECKED BY: KP/JK
PROJECT NUMBER: 14134.000

DBR ENGINEERING CONSULTANTS
TBPE FIRM REGISTRATION NO. 2234

SHEET TITLE: HARPER'S LANDING MEP PLANS, DETAILS AND SCHEDULES

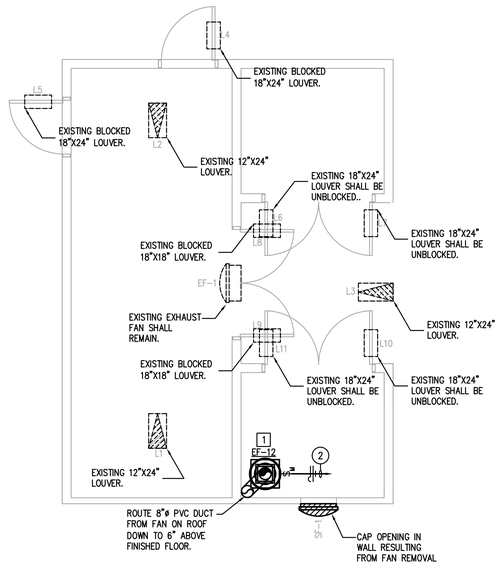
SHEET NUMBER: MEP1.07

STATE OF TEXAS — AARON TABARES — 117394 — LICENSED PROFESSIONAL ENGINEER
09/12/14



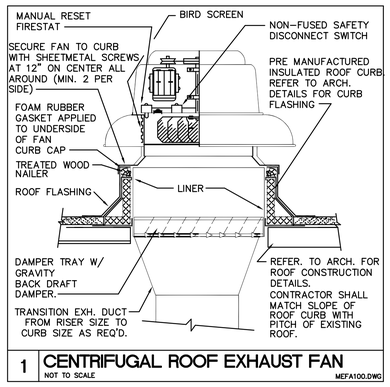
1 MEP1.08 **MEP EXISTING PLAN - LAKESIDE POOL**

1/4"=1'-0"



2 MEP1.08 **MEP PROPOSED PLAN - LAKESIDE POOL**

1/4"=1'-0"



1 **CENTRIFUGAL ROOF EXHAUST FAN**

NOT TO SCALE

MEFA100.DWG

FAN SCHEDULE	
MARK	EF-12
SERVES	LAKESIDE
TYPE/DRIVE	ROOF/DIRECT
CFM	200
EXT. S.P. (IN. W.G.)	0.50
HORSEPOWER	1/20
FAN RPM (MAX.)	1,550
DBA (MAX.)	55.0
VOLTS/PHASE/HERTZ	115/1/60
MANUFACTURER	GREENHECK
MODEL NUMBER	CUE-080-D
NOTES	1, 2

NOTES:

1. PROVIDE FAN WITH PRE-FABRICATED ROOF CURB.
2. PROVIDE FAN WITH WEATHERPROOF DISCONNECT SWITCH AND BACKDRAFT DAMPER.

MECHANICAL GENERAL NOTES

1. CONTRACTOR SHALL COORDINATE WITH STRUCTURAL CONDITIONS AT THE SITE AND PROVIDE ALL CLEARANCES AS INDICATED.
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3. PROVIDE INSULATION FOR ALL DUCTWORK THAT MEETS THE 2009 IECC ENERGY CODE AS SPECIFIED.

MECHANICAL KEYED NOTES

[1] PROVIDE AND INSTALL EXHAUST FAN MOUNTED ON ROOF. CONNECT EXHAUST DUCT RISER TO FAN. PROVIDE TRANSITION AS REQUIRED. RE: DETAIL 1.

ELECTRICAL GENERAL NOTES:

A. OWNER SHALL RESERVE RIGHT TO CLAIM ALL DEVICES REMOVED DURING DEMOLITION.

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C. CONTRACTOR SHALL FIELD VERIFY INTEGRITY OF ANY CONDUCTORS NOTED TO BE REUSED. ANY CONDUCTORS DETERMINED TO BE FAULTY SHALL BE REPLACED.

ELECTRICAL KEYED NOTES:

(1) EXISTING EXHAUST FAN SHALL BE REMOVED. REMOVE ASSOCIATED DISCONNECT SWITCH. EXISTING CONDUIT AND WIRING SHALL REMAIN. CONTRACTOR SHALL COIL AND PROTECT CONDUCTORS FOR CONNECTION TO NEW EQUIPMENT.

(2) CONNECT NEW EXHAUST FAN TO CIRCUIT MADE AVAILABLE AFTER DEMOLITION OF EXISTING EXHAUST FAN.

STATE OF TEXAS
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09/12/14

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REVISION:

THE WOODLANDS TOWNSHIP
POOL PUMP AND CHEMICAL ROOM VENTILATION

DATE:
07/10/2014

DRAWN BY:
CC/JK

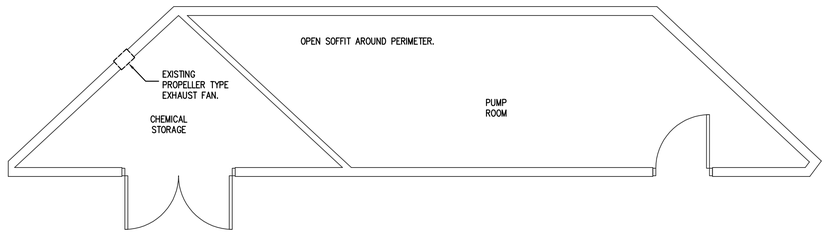
CHECKED BY:
KP/JK

PROJECT NUMBER
14134.000

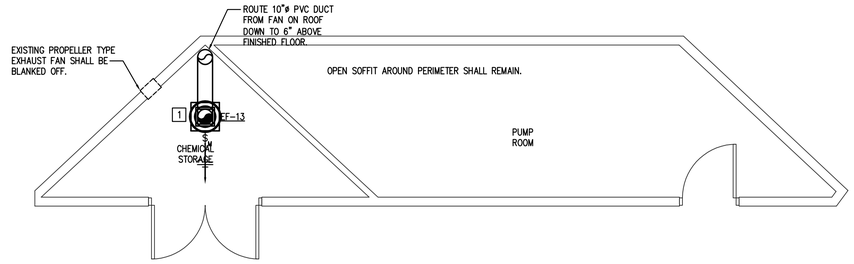
DBR ENGINEERING CONSULTANTS
TBPE FIRM REGISTRATION NO. 2234

SHEET TITLE:
LAKESIDE MEP PLANS, DETAILS AND SCHEDULES

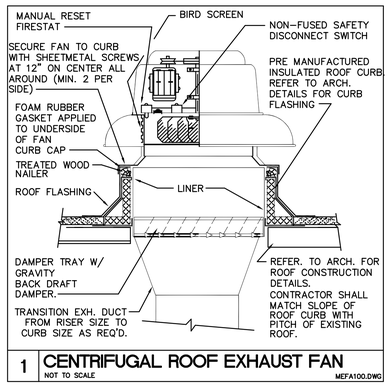
SHEET NUMBER
MEP1.08



1 MEP1.09 **MEP EXISTING PLAN - RIDGEWOOD POOL**
1/4"=1'-0"



2 MEP1.09 **MEP PROPOSED PLAN - RIDGEWOOD POOL**
1/4"=1'-0"



1 **CENTRIFUGAL ROOF EXHAUST FAN**
NOT TO SCALE
MEFA100.DWG

FAN SCHEDULE	
MARK	EF-13
SERVES	RIDGEWOOD
TYPE/DRIVE	ROOF/DIRECT
CFM	300
EXT. S.P. (IN. W.G.)	0.50
HORSEPOWER	1/20
FAN RPM (MAX.)	1,550
DBA (MAX.)	55.0
VOLTS/PHASE/HERTZ	115/1/60
MANUFACTURER	GREENHECK
MODEL NUMBER	CUE-085-D
NOTES	1, 2

NOTES:
1. PROVIDE FAN WITH PRE-FABRICATED ROOF CURB.
2. PROVIDE FAN WITH WEATHERPROOF DISCONNECT SWITCH AND BACKDRAFT DAMPER.

MECHANICAL GENERAL NOTES

1. CONTRACTOR SHALL COORDINATE WITH STRUCTURAL CONDITIONS AT THE SITE AND PROVIDE ALL CLEARANCES AS INDICATED.
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MECHANICAL KEYED NOTES

[1] PROVIDE AND INSTALL EXHAUST FAN MOUNTED ON ROOF. CONNECT EXHAUST DUCT RISER TO FAN. PROVIDE TRANSITION AS REQUIRED. RE: DETAIL 1.

ELECTRICAL GENERAL NOTES:

A. OWNER SHALL RESERVE RIGHT TO CLAIM ALL DEVICES REMOVED DURING DEMOLITION.

B. ALL EQUIPMENT SHOWN IS EXISTING TO REMAIN UNLESS NOTED OTHERWISE.

ELECTRICAL KEYED NOTES:

(1) CONNECT NEW EXHAUST FAN TO NEAREST SPARE 20A/120V CIRCUIT BREAKER. ROUTE (2) #2, (1) #12 G. IN 3/4" C. FROM FAN TO PANELBOARD..

STATE OF TEXAS
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REVISION:

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POOL PUMP AND CHEMICAL ROOM VENTILATION

DATE:
07/10/2014

DRAWN BY:
CC/JK

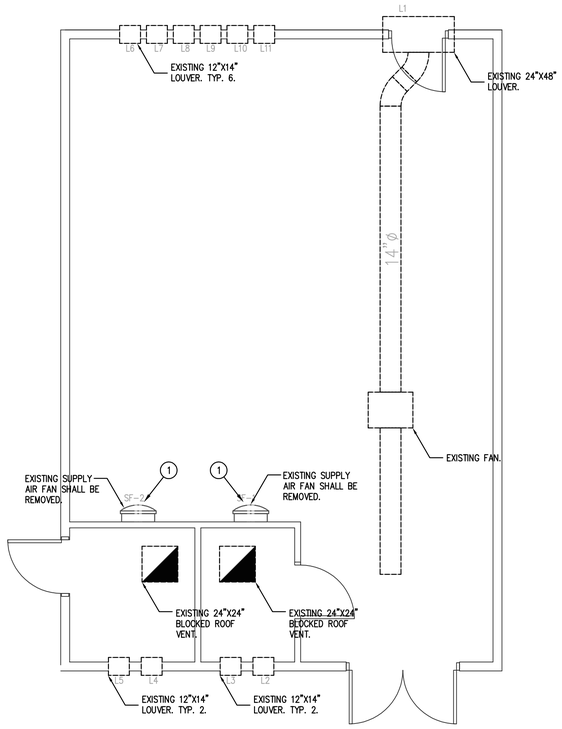
CHECKED BY:
KP/JK

PROJECT NUMBER
14134.000

DBR ENGINEERING CONSULTANTS
TBPE FIRM REGISTRATION NO. 2234

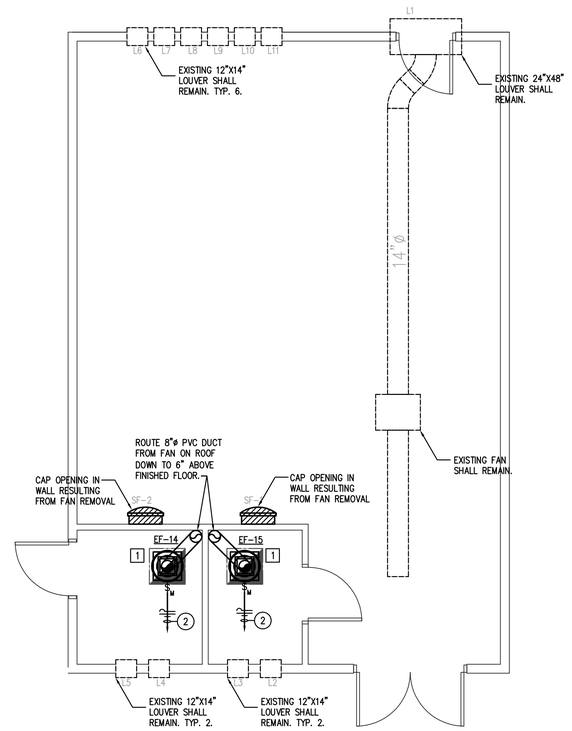
SHEET TITLE:
RIDGEWOOD MEP PLANS, DETAILS AND SCHEDULES

SHEET NUMBER
MEP1.09



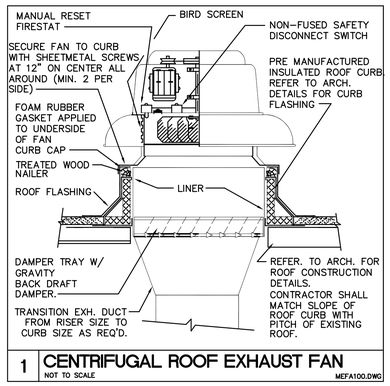
1 MEP1.10 MEP EXISTING PLAN - ROB FLEMING AQUATIC CENTER

1/4"=1'-0"



2 MEP1.10 MEP PROPOSED PLAN - ROB FLEMING AQUATIC CENTER

1/4"=1'-0"



1 CENTRIFUGAL ROOF EXHAUST FAN
NOT TO SCALE
MEFA100.DWG

FAN SCHEDULE	
MARK	EF-14, EF-15
SERVES	ROB FLEMING
TYPE/DRIVE	ROOF/DIRECT
CFM	200
EXT. S.P. (IN. W.G.)	0.50
HORSEPOWER	1/20
FAN RPM (MAX.)	1,550
DBA (MAX.)	55.0
VOLTS/PHASE/HERTZ	115/1/60
MANUFACTURER	GREENHECK
MODEL NUMBER	CUE-080-D
NOTES	1, 2

NOTES:
1. PROVIDE FAN WITH PRE-FABRICATED ROOF CURB.
2. PROVIDE FAN WITH WEATHERPROOF DISCONNECT SWITCH AND BACKDRAFT DAMPER.

MECHANICAL GENERAL NOTES

1. CONTRACTOR SHALL COORDINATE WITH STRUCTURAL CONDITIONS AT THE SITE AND PROVIDE ALL CLEARANCES AS INDICATED.
2. CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR FOR ALL ELECTRICAL POWER REQUIREMENTS.
3. PROVIDE INSULATION FOR ALL DUCTWORK THAT MEETS THE 2009 IECC ENERGY CODE AS SPECIFIED.

MECHANICAL KEYED NOTES

[1] REMOVE EXISTING ROOF VENT. PROVIDE AND INSTALL EXHAUST FAN MOUNTED ON ROOF. CONNECT EXHAUST DUCT RISER TO FAN. PROVIDE TRANSITION AS REQUIRED. RE: DETAIL 1.

ELECTRICAL GENERAL NOTES:

A. OWNER SHALL RESERVE RIGHT TO CLAIM ALL DEVICES REMOVED DURING DEMOLITION.

B. ALL EQUIPMENT SHOWN IS EXISTING TO REMAIN UNLESS NOTED OTHERWISE.

C. CONTRACTOR SHALL FIELD VERIFY INTEGRITY OF ANY CONDUCTORS NOTED TO BE REUSED. ANY CONDUCTORS DETERMINED TO BE FAULTY SHALL BE REPLACED.

ELECTRICAL KEYED NOTES:

(1) EXISTING EXHAUST FAN SHALL BE REMOVED. REMOVE ASSOCIATED DISCONNECT SWITCH. EXISTING CONDUIT AND WIRING SHALL REMAIN. CONTRACTOR SHALL COIL AND PROTECT CONDUCTORS FOR CONNECTION TO NEW EQUIPMENT.

(2) CONNECT NEW EXHAUST FAN TO CIRCUIT MADE AVAILABLE AFTER DEMOLITION OF EXISTING EXHAUST FAN.

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REVISION:

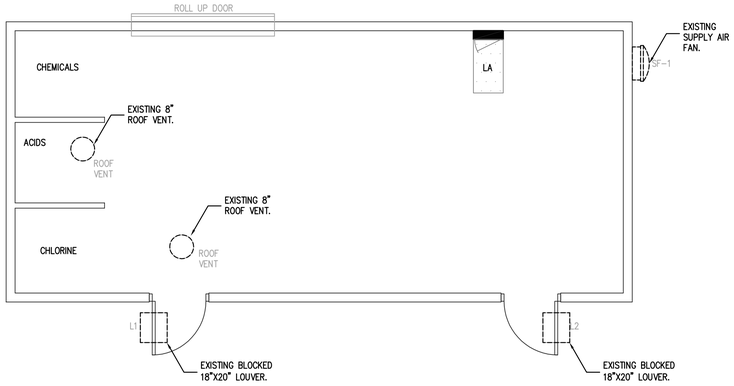
THE WOODLANDS TOWNSHIP
POOL PUMP AND CHEMICAL ROOM VENTILATION

DATE: 07/10/2014
DRAWN BY: CC/JK
CHECKED BY: KP/JK
PROJECT NUMBER: 14134.000

DBR ENGINEERING CONSULTANTS
TBPE FIRM REGISTRATION NO. 2234

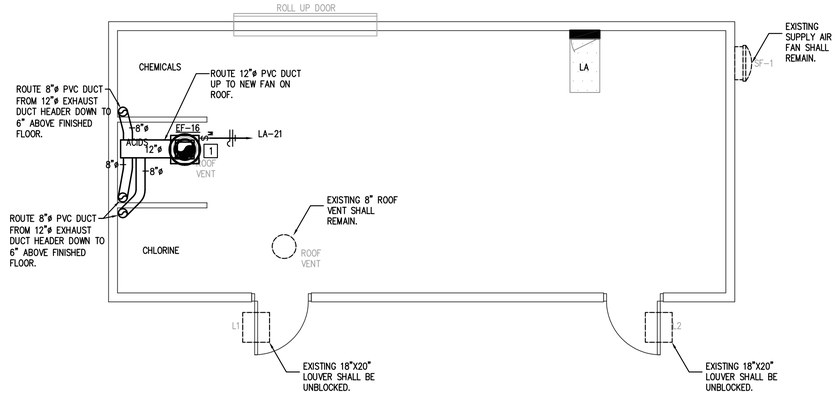
SHEET TITLE:
ROB FLEMING MEP PLANS, DETAILS AND SCHEDULES

SHEET NUMBER
MEP1.10



1 MEP1.11 MEP EXISTING PLAN - SAWMILL POOL

1/4"=1'-0"



2 MEP1.11 MEP PROPOSED PLAN - SAWMILL POOL

1/4"=1'-0"

Lighting Class Panelboard LA — 10,000 AIC Rating; X Existing; New

240 Volt,1-Phase,3-Wire; Section 1 of 1; 1 -Nema Rating | X MCB 200 AMP MCB; MLO 100 AMP BUS (Copper); 100 ISO. GRND. BUS | X Single; Double; Feed - Thru | Mounting: X Surface; Flush

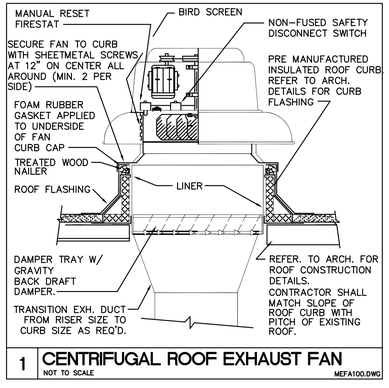
Notes	Load (VA)	Description	Type	Wire	CB	CKT #	PH	CKT #	CB	Wire	Type	Description	Load (VA)	Notes
		EXISTING LOAD		3	100/2	1	A	2	20/1	12				
		-		3	-	3	B	4	20/1	12				
		EXISTING LOAD		12	20/2	5	C	6						
		-		12	-	7	A	8						
		EXISTING LOAD		12	20/1	9	B	10						
		EXISTING LOAD		12	20/1	11	C	12						
		EXISTING LOAD		12	20/1	13	A	14						
		EXISTING LOAD		12	20/1	15	B	16						
		EXISTING LOAD		12	20/1	17	C	18						
		EXISTING LOAD		12	20/1	19	A	20						
	100	EF-16		12	15/1	21	B	22						
		SPACE				23	C	24						
		SPACE				25	A	26						
		SPACE				27	B	28						
		SPACE				29	C	30						
	100	Subtotal										Subtotal	0	

N.E.C.	Load Type	Conn.	Fct.	Diversity	N.E.C.		Conn.	Fct.	Diversity
220.44	(R) Recept.	0		0	210.20(a)	(L) Lighting	0	125%	0
220.56	(K) Kitchen	0	100%	0		(EL) Ext. Ltg.	0	125%	0
220.60	(C) Cooling	0	0%	0	620.14	(E) Elevators	0	100%	0
220.60	(H) Heating	0	0%	0		(WH) Water Ht.	0	100%	0
220.60	(F) Fans	0	100%	0	220.5	(MT) Lrg. Mot.	0	125%	0
	(M) Misc.	0	100%	0		(SP) Sub Panel	0	100%	0

Total Connected Load 0 VA = 0.0 AMPS
Total Load (Diversified 0 VA = 0.0 AMPS
Location of Panel:

FAN SCHEDULE	
MARK	EF-16
SERVES	SAWMILL PARK
TYPE/DRIVE	ROOF/DIRECT
CFM	600
EXT. S.P. (IN. W.G.)	0.60
HORSEPOWER	1/8
FAN RPM (MAX.)	1,550
DBA (MAX.)	56.0
VOLTS/PHASE/HERTZ	115/1/60
MANUFACTURER	GREENHECK
MODEL NUMBER	CUE-095-D
NOTES	1, 2

NOTES:
1. PROVIDE FAN WITH PRE-FABRICATED ROOF CURB.
2. PROVIDE FAN WITH WEATHERPROOF DISCONNECT SWITCH AND BACKDRAFT DAMPER.



1 CENTRIFUGAL ROOF EXHAUST FAN
NOT TO SCALE MEFA100.DWG

MECHANICAL GENERAL NOTES

1. CONTRACTOR SHALL COORDINATE WITH STRUCTURAL CONDITIONS AT THE SITE AND PROVIDE ALL CLEARANCES AS INDICATED.
2. CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR FOR ALL ELECTRICAL POWER REQUIREMENTS.
3. PROVIDE INSULATION FOR ALL DUCTWORK THAT MEETS THE 2009 IECC ENERGY CODE AS SPECIFIED.

MECHANICAL KEYED NOTES

[1] PROVIDE AND INSTALL EXHAUST FAN MOUNTED ON ROOF. CONNECT EXHAUST DUCT RISER TO FAN. PROVIDE TRANSITION AS REQUIRED. RE: DETAIL 1.

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A. OWNER SHALL RESERVE RIGHT TO CLAIM ALL DEVICES REMOVED DURING DEMOLITION.

B. ALL EQUIPMENT SHOWN IS EXISTING TO REMAIN UNLESS NOTED OTHERWISE.

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REVISION:

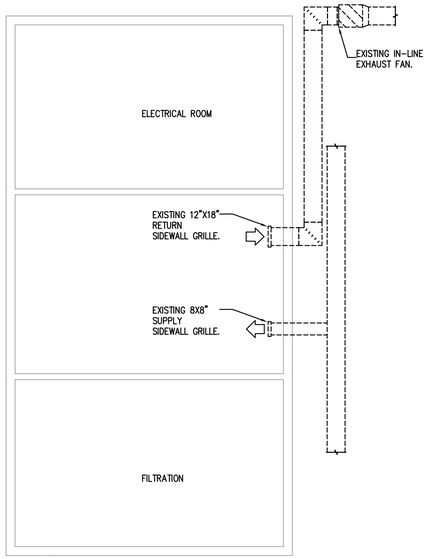
THE WOODLANDS TOWNSHIP
POOL PUMP AND CHEMICAL ROOM VENTILATION

DATE: 07/10/2014
DRAWN BY: CC/JK
CHECKED BY: KP/JK
PROJECT NUMBER: 14134.000

DBR ENGINEERING CONSULTANTS
TBPE FIRM REGISTRATION NO. 2234

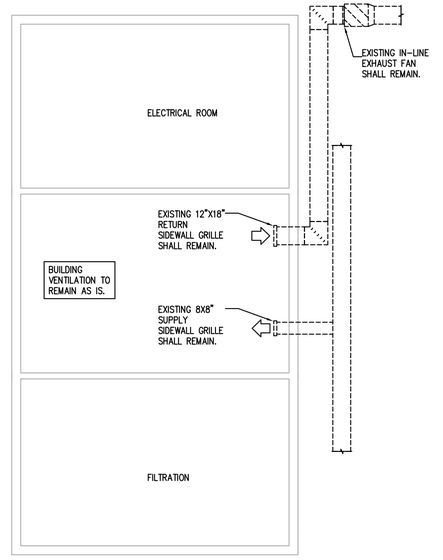
SHEET TITLE: SAWMILL MEP PLANS, DETAILS AND SCHEDULES

SHEET NUMBER: MEP1.11



1 MEP1.12 MEP EXISTING PLAN - WATERWAY SQUARE FOUNTAIN

1/4"=1'-0"



2 MEP1.12 MEP PROPOSED PLAN - WATERWAY SQUARE FOUNTAIN

1/4"=1'-0"

MECHANICAL GENERAL NOTES

1. CONTRACTOR SHALL COORDINATE WITH STRUCTURAL CONDITIONS AT THE SITE AND PROVIDE ALL CLEARANCES AS INDICATED.
2. CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR FOR ALL ELECTRICAL POWER REQUIREMENTS.
3. PROVIDE INSULATION FOR ALL DUCTWORK THAT MEETS THE 2009 IECC ENERGY CODE AS SPECIFIED.

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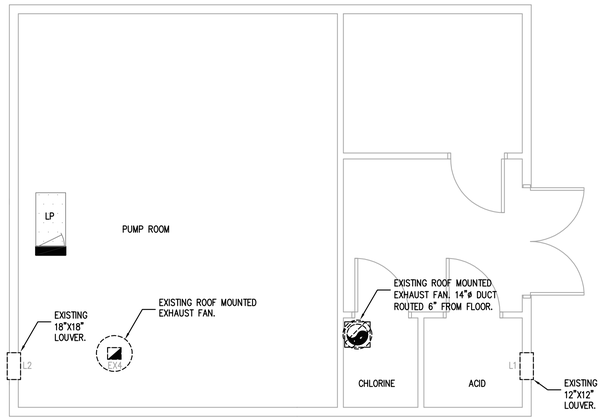
SHEET TITLE:
WATERWAY SQUARE MEP PLANS, DETAILS AND SCHEDULES

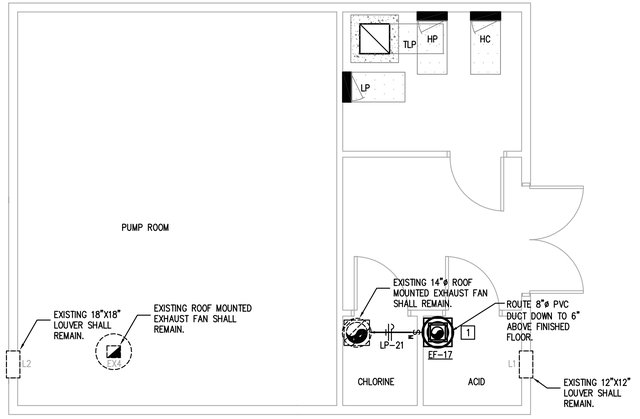
SHEET NUMBER

MEP1.12



1 MEP1.13 MEP EXISTING PLAN - WENDTWOODS POOL

1/4"=1'-0"



2 MEP1.13 MEP PROPOSED PLAN - WENDTWOODS POOL

1/4"=1'-0"

Lighting Class Panelboard LP

10,000 AIC Rating
X Existing
New

120/208 Volt,3-Phase,4-Wire
1 Section
1 -Nema Rating

X MCB
MLO

175 AMP MCB
AMP BUS (Copper)
225 ISO. GRND. BUS

Single
Double
X Feed - Thru

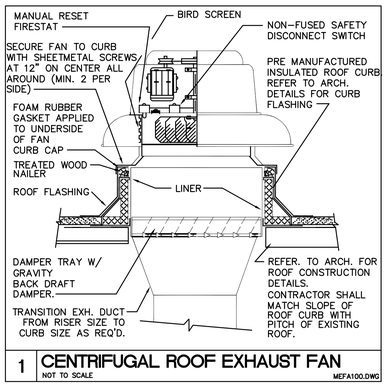
Mounting
X Surface
Flush

Notes	Load (VA)	Description	Type	Wire	CB	CKT #	PH	CKT #	CB	Wire	Type	Description	Load (VA)	Notes
		EXISTING LOAD		12	20/1	1	A	2	20/1	12		EXISTING LOAD		
		EXISTING LOAD		12	20/1	3	B	4	20/1	12		EXISTING LOAD		
		EXISTING LOAD		12	20/1	5	C	6	20/1	12		EXISTING LOAD		
		EXISTING LOAD		12	20/1	7	A	8	20/1	12		EXISTING LOAD		
		EXISTING LOAD		12	20/1	9	B	10	20/1	12		EXISTING LOAD		
		EXISTING LOAD		12	20/1	11	C	12	20/1	12		EXISTING LOAD		
		EXISTING LOAD		12	20/1	13	A	14	20/1	12		EXISTING LOAD		
		SPACE				15	B	16	20/1	12		EXISTING LOAD		
		EXISTING LOAD		10	40/2	17	C	18	20/1	12		EXISTING LOAD		
		-			-	19	A	20	20/1	12		EXISTING LOAD		
	100	EF-17		12	15/1	21	B	22	20/1	12		EXISTING LOAD		
		SPACE				23	C	24	20/1	12		EXISTING LOAD		
		SPACE				25	A	26	20/1	12		EXISTING LOAD		
		SPACE				27	B	28	20/1	12		EXISTING LOAD		
		SPACE				29	C	30	20/1	12		EXISTING LOAD		
		SPACE				31	A	32	20/1	12		EXISTING LOAD		
		SPACE				33	B	34	20/1	12		EXISTING LOAD		
		SPACE				35	C	36	20/1	12		EXISTING LOAD		
		SPACE				37	A	38	20/1	12		EXISTING LOAD		
		SPACE				39	B	40	20/1	12		EXISTING LOAD		
		SPACE				41	C	42	20/1	12		EXISTING LOAD		
	6,440	Subtotal										Subtotal	6,920	

N.E.C.	Load Type	Conn.	Fct.	Diversity	N.E.C.		Conn.	Fct.	Diversity
220.44	(R) Recept.	11,220		10,610	210.20(a)	(L) Lighting	0	125%	0
220.56	(K) Kitchen	0	100%	0		(EL) Ext. Ltg.	0	125%	0
220.60	(C) Cooling	0	0%	0	620.14	(E) Elevators	0	100%	0
220.60	(H) Heating	0	0%	0		(WH) Water Ht.	0	100%	0
220.60	(F) Fans	0	100%	0	220.5	(MT) Lrg. Mot.	0	125%	0
	(M) Misc.	1,500	100%	1,500		(SP) Sub Panel	0	100%	0

Total Connected Load 12,720 VA = 35.3 AMPS
Total Load (Diversified 12,110 VA = 33.6 AMPS

Location of Panel:



1 CENTRIFUGAL ROOF EXHAUST FAN

NOT TO SCALE MEFA100.DWG

FAN SCHEDULE	
MARK	EF-17
SERVES	WENDTWOODS
TYPE/DRIVE	ROOF/DIRECT
CFM	200
EXT. S.P. (IN. W.G.)	0.50
HORSEPOWER	1/20
FAN RPM (MAX.)	1,550
DBA (MAX.)	55.0
VOLTS/PHASE/HERTZ	115/1/60
MANUFACTURER	GREENHECK
MODEL NUMBER	CUE-080-D
NOTES	1, 2

NOTES:
1. PROVIDE FAN WITH PRE-FABRICATED ROOF CURB.
2. PROVIDE FAN WITH WEATHERPROOF DISCONNECT SWITCH AND BACKDRAFT DAMPER.

MECHANICAL GENERAL NOTES

1. CONTRACTOR SHALL COORDINATE WITH STRUCTURAL CONDITIONS AT THE SITE AND PROVIDE ALL CLEARANCES AS INDICATED.
2. CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR FOR ALL ELECTRICAL POWER REQUIREMENTS.
3. PROVIDE INSULATION FOR ALL DUCTWORK THAT MEETS THE 2009 IECC ENERGY CODE AS SPECIFIED.

MECHANICAL KEYED NOTES

[1] PROVIDE AND INSTALL EXHAUST FAN MOUNTED ON ROOF. CONNECT EXHAUST DUCT RISER TO FAN. PROVIDE TRANSITION AS REQUIRED. RE: DETAIL 1.

ELECTRICAL GENERAL NOTES:

A. OWNER SHALL RESERVE RIGHT TO CLAIM ALL DEVICES REMOVED DURING DEMOLITION.

B. ALL EQUIPMENT SHOWN IS EXISTING TO REMAIN UNLESS NOTED OTHERWISE.

STATE OF TEXAS
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REVISION:

THE WOODLANDS TOWNSHIP
POOL PUMP AND CHEMICAL ROOM VENTILATION

DATE: 07/10/2014
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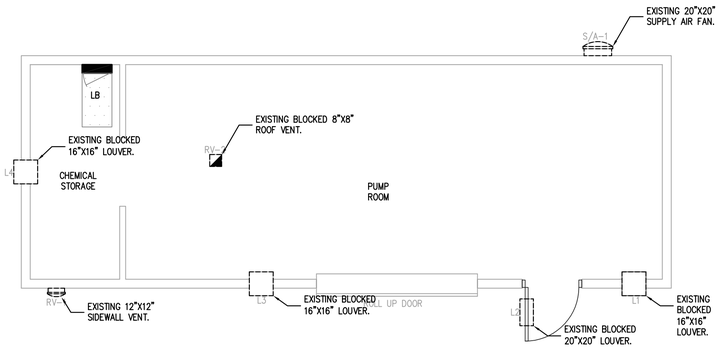
DBR ENGINEERING CONSULTANTS
TBPE FIRM REGISTRATION NO. 2234

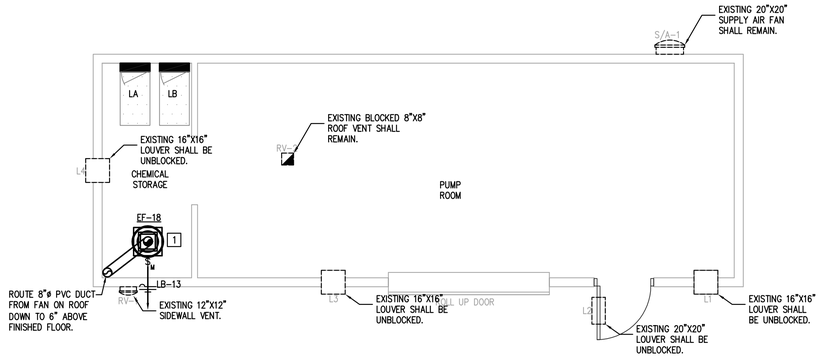
SHEET TITLE:
WENDTWOODS MEP PLANS, DETAILS AND SCHEDULES

SHEET NUMBER
MEP1.13



1 MEP1.14 MEP EXISTING PLAN - WINDVALE POOL

1/4"=1'-0"



2 MEP1.14 MEP PROPOSED PLAN - WINDVALE POOL

1/4"=1'-0"

Lighting Class Panelboard LB

10,000 AIC Rating
X Existing
New

240 Volt,1-Phase,3-Wire
Section 1 of 1
1 -Nema Rating

X MCB 200 AMP MCB
MLO 100 AMP BUS (Copper)
ISO. GRND. BUS

X Single
Double
Feed - Thru

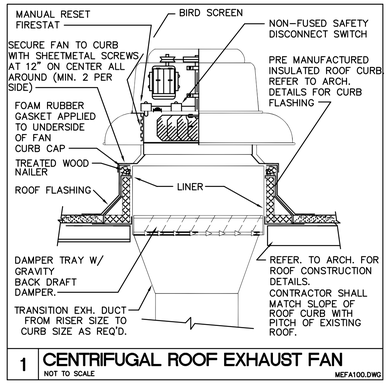
Mounting
X Surface
Flush

Notes	Load (VA)	Description	Type	Wire	CB	CKT #	PH	CKT #	CB	Wire	Type	Description	Load (VA)	Notes
		EXISTING LOAD		12	20/1	1	A	2	20/1			EXISTING LOAD		
		EXISTING LOAD		12	20/1	3	B	4	20/1			EXISTING LOAD		
		EXISTING LOAD		12	20/1	5	C	6	20/1			EXISTING LOAD		
		EXISTING LOAD		12	20/1	7	A	8	20/1			EXISTING LOAD		
		EXISTING LOAD		12	20/1	9	B	10	20/1			EXISTING LOAD		
		EXISTING LOAD		12	20/1	11	C	12				SPACE		
	100	EF-18		12	15/1	13	A	14				SPACE		
		SPACE				15	B	16				SPACE		
		SPACE				17	C	18				SPACE		
		SPACE				19	A	20				SPACE		
		SPACE				21	B	22				SPACE		
		SPACE				23	C	24				SPACE		
	100	Subtotal										Subtotal	0	

N.E.C.	Load Type	Conn.	Fct.	Diversity	N.E.C.		Conn.	Fct.	Diversity
220.44	(R) Recept.	0		0	210.20(a)	(L) Lighting	0	125%	0
220.56	(K) Kitchen	0	100%	0		(EL) Ext. Ltg.	0	125%	0
220.60	(C) Cooling	0	0%	0	620.14	(E) Elevators	0	100%	0
220.60	(H) Heating	0	0%	0		(WH) Water Ht.	0	100%	0
220.60	(F) Fans	0	100%	0	220.5	(MT) Lrg. Mot.	0	125%	0
	(M) Misc.	0	100%	0		(SP) Sub Panel	0	100%	0

Total Connected Load 0 VA = 0.0 AMPS
Total Load (Diversified 0 VA = 0.0 AMPS

Location of Panel:



1 CENTRIFUGAL ROOF EXHAUST FAN

NOT TO SCALE MEFA100.DWG

FAN SCHEDULE

MARK	EF-18
SERVES	WINDVALLE PARK
TYPE/DRIVE	ROOF/DIRECT
CFM	200
EXT. S.P. (IN. W.G.)	0.50
HORSEPOWER	1/20
FAN RPM (MAX.)	1,550
DBA (MAX.)	55.0
VOLTS/PHASE/HERTZ	115/1/60
MANUFACTURER	GREENHECK
MODEL NUMBER	CUE-080-D
NOTES	1, 2

NOTES:
1. PROVIDE FAN WITH PRE-FABRICATED ROOF CURB.
2. PROVIDE FAN WITH WEATHERPROOF DISCONNECT SWITCH AND BACKDRAFT DAMPER.

MECHANICAL GENERAL NOTES

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3. PROVIDE INSULATION FOR ALL DUCTWORK THAT MEETS THE 2009 IECC ENERGY CODE AS SPECIFIED.

MECHANICAL KEYED NOTES

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ELECTRICAL GENERAL NOTES:

A. OWNER SHALL RESERVE RIGHT TO CLAIM ALL DEVICES REMOVED DURING DEMOLITION.

B. ALL EQUIPMENT SHOWN IS EXISTING TO REMAIN UNLESS NOTED OTHERWISE.

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REVISION:

THE WOODLANDS
POOL PUMP AND CHEMICAL ROOM VENTILATION

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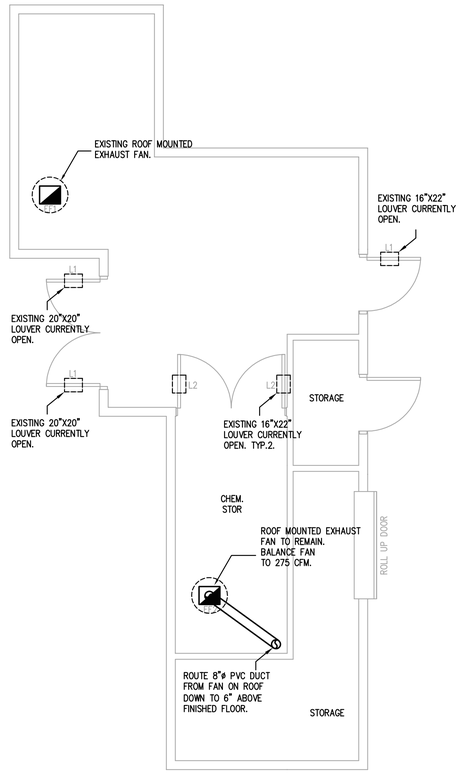
TBPE FIRM REGISTRATION NO. 2234

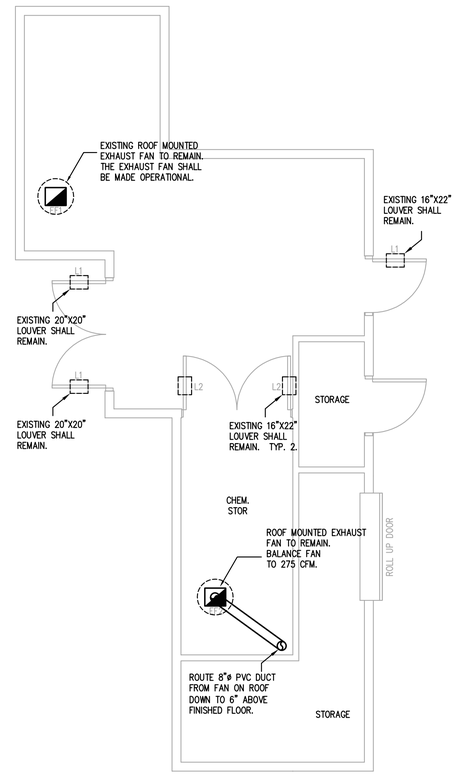
SHEET TITLE: WINDVALLE MEP PLANS, DETAILS AND SCHEDULES

SHEET NUMBER: MEP1.14



1 MEP1.15 **MEP EXISTING PLAN - SHADOWBEND POOL**

1/4"=1'-0"



2 MEP1.15 **MEP PROPOSED PLAN - SHADOWBEND POOL**

1/4"=1'-0"

MECHANICAL GENERAL NOTES

1. CONTRACTOR SHALL COORDINATE WITH STRUCTURAL CONDITIONS AT THE SITE AND PROVIDE ALL CLEARANCES AS INDICATED.
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SHEET TITLE:
SHAWDOW BEND MEP PLANS, DETAILS AND SCHEDULES

SHEET NUMBER

MEP1.15